Type shifting in construction grammar: An integrated approach to aspectual coercion*

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Abstract

Implicit type shifting, or coercion, appears to indicate a modular grammatical architecture, in which the process of semantic composition may add meanings absent from the syntax in order to ensure that certain operators, e.g., the progressive, receive suitable arguments (Jackendoff 1997; De Swart 1998). I will argue that coercion phenomena actually provide strong support for a sign-based model of grammar, in which rules of morphosyntactic combination can shift the designations of content words with which they combine. On this account, enriched composition is a by-product of the ordinary referring behavior of constructions. Thus, for example, the constraint which requires semantic concord between the syntactic sisters in the string a bottle *is also what underlies the coerced interpretation found in* a beer. *If this concord constraint is stated for a rule of morphosyntactic combination, we capture an important generalization: a single combinatory mechanism, the construction, is responsible for both coerced and compositional meanings. Since both type-selecting constructions (e.g., the French* Imparfait) *and type-shifting constructions (e.g., English progressive aspect) require semantic concord between syntactic sisters, we account for the fact that constructions of both types perform coercion. Coercion data suggest that aspectual sensitivity is not merely a property of formally differentiated past tenses, as in French and Latin, but a general property of tense constructions, including the English present and past tenses.*

Keywords: construction grammar; coercion; aspect; argument structure; nominal morphosyntax; tense.

1. Introduction

Theories of sentence meaning describe the relationship between the meaning of a sentence and the meanings of the words of that sentence. These

theories have long focused on the connection between the semantic requirements of a lexical head and the type denoted by syntactic projections of that head. Models of this connection are based upon an assumption which I will call lexical licensing. Lexical licensing holds that content words constrain potential sisterhood relations by listing the types of complements, adjuncts, and specifiers which they either require or welcome. Rules of syntactic combination assemble heads and their dependent elements into phrases. These rules do not add conceptual content to that contributed by the words and therefore do not alter the combinatory potential of words. Lexically driven syntax has streamlined syntactic theory, but the principle of lexical licensing has proven difficult to reconcile with cases in which linguistic interpretation requires the interpolation of "extra" meaning—what Jackendoff (1997a) refers to as enriched composition. The effects in question are the products of a mechanism which is commonly called coercion. Coercion, according to De Swart (1998: 360), is "syntactically and morphologically invisible: it is governed by implicit contextual reinterpretation mechanisms triggered by the need to resolve [semantic] conflicts". Coercion effects have been identified in nominal syntax (Talmy 1988), verbal aspect (Pustejovsky 1991; Verkuyl 1993; De Swart 1998), verbal argument structure (Goldberg 1995; Michaelis and Ruppenhofer 2001), and pragmatically specialized sentence types (Michaelis and Lambrecht 1996).

   Projection-based theories of the syntax-semantics interface, including Lexical Functional Grammar (Bresnan 2001), Head-Driven Phrase Structure Grammar (Pollard and Sag 1994) and Role and Reference Grammar (Van Valin and LaPolla 1997), tend to focus on verbal argument structure, and for good reason: the relationship between verbal semantic requirements and clause meaning appears highly transparent. For example, the sentence *We gave the account to her* denotes an event of transfer—involving an agent, a "gift", and a recipient—because the verb *give* denotes a scene of transfer, and likewise requires the presence of these three participants. But if verb meaning drives thematic structure, what drives verb meaning? The scholarly consensus holds that it is verbal Aktionsart, or, equivalently, inherent lexical aspect: verbal aspect is used to predict verbal morphosyntax, not only at the levels of argument-frame computation and adjunct licensing but also at the level of inflection. The phenomenon of aspectual coercion has important implications for theories of the syntax-semantics interface because it suggests that verbal aspect is in fact an unreliable predictor of verbal morphosyntax. More generally, it shows that lexical projection is an inadequate licensing mechanism. In this article, I will propose a more inclusive licensing mechanism, which, I will argue, accounts for the coercion effects exemplified in

(1) to (6), as well as the syntactically transparent interpretive conditions captured by projection-based approaches. The examples in (1) to (3) have been widely discussed in the literature on aspectual coercion, while those in (4) to (6) have not previously been described as coercion effects:

(1) *I was outside* twice.
(2) *They were bored* in a minute.
(3) *I* am *liv*ing *on Pearl Street*.
(4) *I* have *liv*ed *on Pearl Street*.
(5) *She smoke*s.
(6) I peered through the curtain. *Sue seem*ed *upset*.

In each of these examples, a tense or aspect operator combines with a predicate-argument structure (shown in italics) with which it conflicts semantically. Following general practice, I will represent these predicate-argument structures as tenseless clauses, e.g., *I be- outside, I live- on Pearl Street, She smoke-*. I will refer to such tenseless clauses as *situation radicals*, using more specific Aktionsart-class labels, e.g., *state radical* and *activity radical*, as needed. Following Herweg (1991), I will adopt the following assumptions:

  i. event radicals and state radicals are categories of situations, which can be represented as predicates in logical structure
 ii. event radicals are predicated of existentially or anaphorically bound event variables: $P(e)$
iii. state radicals are properties of the intervals for which they are asserted to obtain: $P(t)$

In accordance with Dowty (1986), among others, I will assume that Aktionsart-class characterizations accrue to situation radicals rather than, say, to verbs in isolation, but that verbs project default aspectual properties, e.g., the so-called subinterval property. The subinterval property in fact plays a role in the semantic conflict exemplified in (1). According to Herweg (1991: 976), frequency adverbials enumerate applications of a given situation-type predicate to its argument. Since *I be- outside* is a subinterval predication, it can apply infinitely to the interval which is its argument, since all subintervals of the argument interval have subparts as well. Therefore, the application of the predicate to the interval is infinite, and in principle incapable of enumeration by an expression such as *twice*.

   The conflict exemplified in (2) involves a clash between the semantics of state radicals and the semantic requirements of frame adverbials. Frame adverbials are interpreted according to the logic of containment; the containment schema licenses upward entailment and downward compatibility relative to a scale. If, for example, I finished a particular task within

ten minutes, I also finished it within twenty minutes. And if in fact I finished the task within five minutes, I could still truthfully assert that I had finished it in ten minutes. This pattern of reasoning is inverted in the case of assertions involving intervals of states and activities. Such assertions are intrinsically upward compatible with respect to their reference times. For example, the stative sentence *He was in London yesterday* can always be interpreted in such a way that the state of his being in London is not circumscribed by (and in fact contains) the temporal boundaries denoted by *yesterday*. Frame adverbials—by the logic of containment—entail that the situation denoted is circumscribed by the expressed interval. For this reason, frame adverbials require telic event-type arguments. This requirement is the basis of the semantic conflict which plays a role in the interpretation of (2).

Sentence (3) exemplifies a classic problem in the analysis of the English progressive construction. It is generally accepted that the progressive operator is a stativizer; stativity tests substantiate this view. For example, as observed by Vlach (1981), a situation reported by means of a past-tense progressive main clause is necessarily construed as having obtained prior to a past action reported in a *when*-clause. This is shown in (7):

(7)   We were playing cards when she came in.
(8)   We were asleep when she came in.
(9)   We got up when she came in.

The progressive main clause in (7) entails that card playing was going on prior to her arrival. This entailment is analogous to that of the stative main clause in (8): sleeping was going on prior to her arrival. Sentence (9) contains a perfective main clause. As a result, (9) does not describe a situation which began prior to the past reference time established by the getting-up event: the getting-up event *follows* her arrival. The examples in (7) to (9) show that progressive sentences pattern like state sentences, as in (8), rather than event sentences, as in (9). The state denoted by a progressive predication is derived in a manner analogous to portion extraction at the level of nominal syntax (Langacker 1987, 1993): the denoted state is a proper subpart of that event denoted by the participial complement. Under this analysis, the state radical *I live- on Pearl Street* in (3) does not provide the proper input for the progressive operator, expressed by the periphrasis *be-ing*.

Like the progressive, the perfect, as exemplified in (4), is a stativizer. The *when*-test, described immediately above, supports this analysis. The state denoted by a perfect-form sentence is the state of aftermath following the culmination of that event denoted by the participial complement (Herweg 1991, De Swart 1998, Michaelis 1998). As required by the Vlach

stativity diagnostic, this state of aftermath is understood to obtain prior to the event denoted by a perfective *when*-clause:

(10)   We had played cards when they came in.

While the activity of playing cards constitutes an episode, the participial complement of the perfect predication in (4) denotes a state rather than an event—the state of living on Pearl Street. A state which is asserted to hold in the past need not end in the past, and therefore past state predications do not entail any period of aftermath. As was the case in (3), the state radical *I live- on Pearl Street* does not provide the proper input for a stativing operator, in this case the perfect operator. Despite this mismatch, however, (4) is a grammatical sentence.

   Present-tense predications like that in (5) are commonly described as habitual sentences, but the label *habitual* has been applied to a disparate set of semantic implications in the aspectual literature. De Swart (1998: 383) describes the habitual operator as "mapping eventuality descriptions onto state descriptions". This analysis makes sense in light of the stative properties which habitual predications display. For example, habitual sentences denote situations which, like states, can extend to the present. This is shown by the fact that the conjoined past and present assertions in (11a) are compatible, while those in (11b) are not:

(11)   a.   She smoked back then and I think she still does.
       b.   *They had an argument and I think they still do.

Habitual activity is also the default inference available to interpreters when they must reconcile perfective verbal Aktionsart with imperfective morphosyntax, as in (12a–b):

(12)   a.   She smokes. (example [5])
       b.   She smoked when I met her.

In (12a) the event radical *She smoke-* is coded by means of a present-tense predication—a grammatical option not ordinarily available to event predications, as shown by the anomalous nature of present reports like *She smokes right now*. Sentence (12b) entails that the denoted situation obtained prior to a past event (my meeting her)—an additional hallmark of stative predications, as we have seen. If habitual events are states, as claimed by De Swart (1998) and others (e.g., Langacker 1996), then the facts in (11) and (12) fall out. However, this model of habituality begs two basic questions. First, why *should* habitual situations be stative? They do not qualify as such on the basis of their internal composition, which is isomorphic to that of iterated events. A situation consisting of a series of type-identical subevents, e.g., bouncing a ball or jumping up and

down, qualifies as a dynamic situation—an activity in the Dowty-Vendler framework (see also Van Valin and LaPolla 1997). Similarly, the pairing of an event radical with a frequency adverbial like *many times* does not entail stativity. If like iteration, habituality fails to entail stativity, we must determine what the semantic link between habitual situations and stative ones actually is. Second, what aspectual operators trigger the stative type shifts which lead, either directly or indirectly, to habitual readings? The only plausible sources of aspectual information in (12) are the tenses, but tenses are generally construed as purely deictic categories.

Certainly, typological studies attest to the semantic sympathy that exists between present tense and habitual aspect (see, e.g., Dahl 1995 and Bybee et al. 1994: 151–153), but if habituality is an implication, aspectual or otherwise, of the present tense, past-tense habitual predications remain unexplained. The English past does not uniformly induce stative readings. In sentence (6), repeated as (13), the past in fact appears to impose an *event* construal upon a state radical:

(13)   I peered through the curtain. *Sue seem*ed *upset*.

In addition to its stative ''concord'' reading, in which Sue's being upset obtained prior to my peering through the curtain, (13) has a coerced inchoative reading in which Sue's being upset began after the peering event. If implicit type shifts are to represent linguistically licensed inferences, they must have morphosyntactic triggers. If a tense marker can trigger an aspectual type shift, then it is ipso facto aspectually sensitive. However, as we have just seen, the behavior of the English past tense in particular is paradoxical, suggesting two antithetical patterns of aspectual concord.

On the basis of (1) to (6), we can derive the following four generalizations. First, aspectual operators can apply even in the absence of an appropriate situation-type argument, since the argument can adapt to the requirements of the functor. This fact is difficult to model in a noncircular way, since a given operator must not only operate on the output of an inference rule, but also trigger the very inference rule which is responsible for its ability to apply. Bickel's (1997) model of episodic coercion appears to eliminate this circularity by providing an independently motivated characterization of the associated inference patterns—as Gricean informativeness or quality implicatures (1997: 118). But the coercion effects exemplified in (1) to (6) are not plausibly analyzed as products of generalized implicature: as implications they are neither detachable nor obviously defeasible.

Second, lexical-head licensing does not account for all interpretable verb-adjunct combinations, and a reverse direction of licensing is required as well. In the case of (2), for example, it would make no sense to claim

that the stative lexical head *be* (or any of its syntactic projections) licenses the frequency adjunct *twice*, because the Aktionsart of *be* conflicts with the aspectual requirements of the adjunct. Instead, it appears that the adjunct selects for a particular Aktionsart class, and modulates the aspectual construal of the verb accordingly.

Third, aspectual coercion effects may be either *exocentric*—as in the case of the temporal adjuncts, which are not syntactic heads—or *endocentric*, as in the case of the progressive and perfect constructions. In the case of the progressive, for example, it is the auxiliary head *be* which selects for a participial complement of the appropriate aspectual class, forcing a dynamic reading in the "mismatch" condition (3). More generally, aspectual operators do not have a uniform syntactic characterization: a licensing element within a construction may be the syntactic head, as in (3), or it may not be, as in (1) and (2).

Fourth, coercion effects arise from two distinct types of aspectual operators. Type-sensitive operators are those which do not change the aspectual class of the verb or its projection, but merely require an argument of a given situation type. This class of operators is exemplified by the two temporal adjuncts in (1) and (2). Type-shifting operators belong to the system of aspectual operators described by Herweg (1991: 969) as mapping "state types onto event types and vice versa". This type is exemplified by the progressive construction. What is important for our purposes is that both type-shifting constructions and type-selecting constructions can modulate the aspectual properties of the situation radicals with which they are combined.

It is my contention here that a construction-based model captures each of the foregoing facts in a general and revealing way. First, the constructional framework provides an integrated (nonmodular) account of the mechanism through which aspectual operators create interpretive contexts. Coercion effects are triggered when the interpreter must reconcile the meaning of a morphosyntactic construction with the meaning of a lexical filler. Coercion effects, rather than representing a special form of composition, are by-products of the ordinary significations of constructions.

Second, the constructional account avoids the need for the kinds of semantico-pragmatic "patches" required by the lexical-licensing model, since it is the construction, rather than a lexical head, which determines combinatory possibilities for a given open-class element. Thus, for example, the template which licenses frequency adverbs invokes the class of event radicals. While the frequency adverbial construction "counts" as a verbal projection (and has a verbal head), the verbal head merely determines (external) syntactic category, not (internal) subcategorization. In place of (unilateral) lexical projection, there is (bilateral) semantic con-

cord. In the frequency adverbial construction, the adverbial adjunct calls for a perfective sister, just as the verb licenses a frequency adverbial within its valence set. The formal mechanism which represents this mutual ''calling for'' or invocation function is unification. Unification indices connect the lexical verb with an event variable in the valence structure of the adverb, ensuring semantic concord between the verb and its adverbial sister.

Third, the constructional model captures the two types of coercion effects, exocentric and endocentric, by using a single combinatory mechanism. As stated above, there is no necessary relationship between being a syntactic head and being a semantic functor, and therefore licensing behavior need not be taken as a priori evidence of syntactic-head status. Since combination in unification-based syntax has nothing per se to do with phrase building, invocation is not the unique domain of syntactic heads.

Fourth, the fact that there are two sources of coercion effects is highly motivated when we consider the properties which are shared by type-selecting constructions (like indefinite determination) and type-shifting constructions (like the progressive). Both kinds of constructions denote types, whether entities or events, and place constraints upon the lexically expressed types with which they combine. These constraints give rise to type shifts when conflict resolution is required.

In the model of aspectual meaning that I will propose here, aspectual types are denoted not only by verbs and their projections, but also by morphosyntactic templates of varying degrees of specificity. In this model, rules of morphosyntactic combination can shift the designations of words and alter their combinatory potential. This model is based upon construction grammar (CG) (Fillmore et al., to appear; Kay and Fillmore 1999; Zwicky 1994; Goldberg 1995; Michaelis and Lambrecht 1996; Michaelis 1998; Koenig 1999). In construction grammar, syntactic constructions mean what they mean in the same way that words mean what they mean: they denote. In a symbolic model of syntax, coercion is not merely the resolution of semantic conflict, but is instead the resolution of conflict between constructional and lexical denotata.[1]

The remainder of this article will be structured as follows. In section 2, I will set forth a model of Aktionsart representation based upon temporal and causal properties, relate this model to the aspectual supercategories indexed by constructions, and describe the distortions of Aktionsart structure which underlie coercion effects. In section 3, I will discuss the pitfalls of modular approaches to coercion effects. In section 4, I will describe the construction-based model and its unification-based implementation, using nominal syntax to illustrate both transparent and enriched composition. In section 5, I will apply the model to three distinct classes

of aspectual constructions: aspectual concord constructions (as illustrated by the English frame and frequency adverbial constructions), aspectual shift constructions (as illustrated by the English progressive and perfect constructions), and tense constructions (as illustrated by the present and past constructions in English and French). Following De Swart (1998), I will take the shift-effecting properties of tenses as evidence of aspectual sensitivity. However, I will reject the view—implicit in De Swart's model —that aspectual sensitivity is a property of certain tense operators in certain languages. Instead, I will argue, aspectual selection is what tense constructions intrinsically do.

2.   Aspectual meaning and aspectual type shifts

2.1.   *Aspectual meaning*

How, and in what form, is aspectual information made available to morphosyntax? The mechanism is invocation, as described by Zwicky (1994); the categories invoked are aspectual types. While constructions which index aspectual categories may be aspectual constructions, they need not be: tense and evidential constructions, among others, typically invoke specific aspectual types. In this analysis, I will assume that the aspectual types invoked by morphosyntactic constructions are identical to those denoted by verbs and their projections. This is not a traditional view. In the aspectual literature, it is generally assumed that while verbs and verbal projections express ontological distinctions, e.g., the event–state distinction, grammatical markers express viewpoint-based distinctions, e.g., the perfective–imperfective distinction. On this style of account, of which Smith (1997) and Comrie (1976) are representative, perfective marking is used to present a situation as having begun and ended within the relevant interval. Imperfective marking, by contrast, "presents part of a situation, with no information about its endpoints" (Smith 1997: 73). This type of account is based upon a visual metaphor, in which the grammatical aspects are lenses of various powers through which speakers view the event schemas denoted by verbs. While this basic metaphor is well founded and revealing, it obscures the fact that aspectual presentation is a form of categorization.

   The foregoing point may be best understood by analogy to the domain of entities. While we could say, for example, that the speaker who pairs a mass noun with an indefinite article is "attending to the boundaries of the substance", such an account would fail to capture a generalization: this speaker is presenting a mass as an individuated entity by using the syntactic structure otherwise projected by count nouns. By the same token, the speaker who combines an event verb with the morphosyntax typically

projected by a state verb is presenting that event as an instance of the state category, just as the combination of perfective morphosyntax with a state verb entails that the state so presented is a type of event. If aspectual encoding is ad hoc categorization, then it is reasonable to conclude that the event–state distinction underlies semantic representation at both the lexical and morphosyntactic level.

What is the semantic basis of the event–state distinction? According to Langacker (1987: 258), this distinction has a ''primal character'', because it is linked to a basic cognitive capacity: the ability to perceive change (or stasis) over time. It is generally agreed that while events contain distinct subevents and are bounded in time, states lack internal structure and are not bounded in time. In Langacker's words, ''the covariant properties of change and bounding can be regarded as two sides of the same coin (as can their opposites, constancy and open-endedness)'' (1987: 261). Although this characterization is generally valid, it does not obviously extend to those events which partake of both imperfective and perfective properties. These events, which are generally referred to as either activities or processes, include running and reading. Like other event types, activities in English cannot be reported as ongoing at speech time by means of the simple present tense: *Look! Sue reads*. While activities like reading contain distinct subevents (e.g., page scanning and page turning), their endpoints are arbitrary. Unlike so-called telic events, they can be protracted indefinitely through the iteration of their subevents; no subevent represents a logical stopping point, since activities do not culminate in any resultant state. While there are activities which have episodic construals, e.g., sleeping, sitting in a chair, and holding something in one's hand, these activities lack subevents; they are simply periods of stasis. I will refer to such activities as homogeneous activities, to distinguish them from those activities which, like running and singing songs, have heterogeneous internal part-structure when parsed into sufficiently small subintervals. Because some activities are in principle unbounded while others lack subevents, it appears that the two properties of change and boundedness, while jointly defining the class of telic events (accomplishments and achievements), are only sufficient conditions upon eventhood and not necessary ones.

The property which unifies all event types is epistemological in nature: events are those situations whose existence cannot be verified on the basis of a momentaneous ''sample''. Let us illustrate this criterion by application to the least prototypical class of events—activities, both heterogeneous and homogeneous. Verification of a heterogeneous activity, e.g., running, requires several frames. Since running consists of successive leaps involving alternating legs, witnessing a single leap is insufficient to

verify an event of running. Verification of a homogeneous activity like holding a broom, standing in a corner, or sleeping, requires access to points of inception and termination, as well as several contiguous frames between those endpoints. Sleeping is distinct both from being comatose and from nodding off for a second, and staying at one's sister's house is distinct both from popping in on one's sister and living with her. While states like being tall endure in the same way that the events of sleeping and standing in a corner do, states do not take time: any subinterval of a state counts as an instance of that same state. The existence of a state can thus be confirmed on the basis of an atemporal sample. The same cannot be said of a state phase, e.g., *She was sick for three days* or *She was short as a child*: once the duration of a state is fixed, it is "tracked" in the same manner that an activity would be. Unlike activities, however, state phases do not entail energy input. For example, one can try to sleep or lie on the floor, but one cannot try to be sick for three days or to be short as a child.

The epistemic criterion described here is highly compatible with the picture of the event–state distinction which emerges in the viewpoint-based models of grammatical aspect discussed above: perfective aspect involves "endpoint focus" because the assertion that an event exists entails confirmation that this event has begun or ceased, or both. Under the assumption that grammatical aspect and Aktionsart have uniform semantic representations, we expect that categories at the two levels will have such isomorphic characterizations. Figure 1 gives a hierarchical classification of the Aktionsart classes.

In Figure 1, situations are divided into those which take place over time (events) and those which hold at a given point in time, states (STA). Within the class of events, a division is made between those events which culminate in a specific resultant state (directed events) and those which do not (episodic events). The class of directed events is divided into accomplishments (ACC), effected changes of state, which involve a preparatory process, and achievements (ACH). Achievements are state changes which come about rather than being brought about (Croft 1998; Van Valin and LaPolla 1997). Within the class of episodic events, we distinguish between activities and phases. The label *activity* is used to refer to the class of actions which occur over a period of time but do not culminate (Binnick 1991: 142–143). This category includes both internally homogeneous activities (HOM-ACT) and activities which comprise iterated subevents (HET-ACT). The category of phase includes nondynamic situations which nonetheless have duration. This category has a single member, that of state phases (STA-PHA). State phases are states which begin and end within the reference interval and can be assigned an explicit duration, e.g., *I was depressed when I lived there* (Herweg 1991). In contrast to
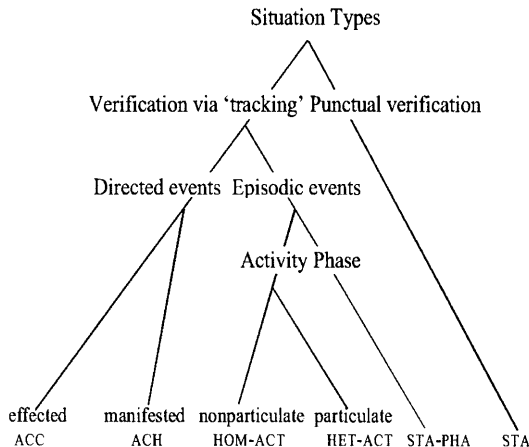
Figure 1.   *Hierarchical structure for the Aktionsart classes*

states, state phases have perfective behavioral properties. For example, they can be enumerated (*Anna was ill for two weeks twice*) and they cannot be reported by means of the simple present tense (**Anna is ill for two hours*). Like states, however, state phases require no energy expenditure for their maintenance.

2.2.   *A two-tier model of Aktionsart representation*

Situation types are both frames and topological structures. They are frames because they jointly index an idealized causative event (Lakoff and Johnson 1980: 69–71; Croft 1998; Smith 1997: 21–22). This event involves direct manipulation of an entity by an agent, who brings about a perceptible change of state in that entity. The situation types are characterized with regard to the "span" of the causal chain which they denote. For example, activities prototypically represent motor programs executed by agents while states prototypically represent effects. Situation types are topological structures because they occupy intervals in characteristic ways, irrespective of the size of the interval. Aspectual topology underlies space-time analogies that are widely used in aspectual theory, in which states count as masses and events as individuals based on criteria like enumerability and internal composition. Because situation types have both frame-semantic and dimensional properties, it makes sense that both causal representations and temporal representations should figure in the description of aspectual type shifts. In the following two subsections, I will describe these two representational systems.

Table 1. *Causal representation (based on Rappaport Hovav and Levin 1998)*

Aktionsart class	Causal representation
State	[x ⟨STATE⟩] e.g., *seem*
State phase	[HOLD [x ⟨STATE⟩]] e.g., *be sick for two days*
Homogeneous activity	[x HOLD [x ⟨STATE⟩]] e.g., *sleep*
Heterogeneous activity	[x REPEAT [x ⟨EVENT⟩]] e.g., *skip*
Achievement	[BECOME [x ⟨STATE⟩]] e.g., *sink*
Accomplishment	[[[x REPEAT [x ⟨EVENT⟩]] CAUSE [BECOME [y ⟨STATE⟩]]] e.g., *build*

2.2.1. *Causal representation.* Rappaport Hovav and Levin (1998) capture the distinction between aspectual and frame-specific features of verb meaning by proposing a set of fixed event-structure templates with which verbs can combine. Verbs ''fill in'' information represented by constants; the type of the constant determines the information that the verb will be required to provide. Table 1 presents an adaptation of Rappaport Hovav and Levin's inventory of event-structure templates. In these templates, operators (shown in small caps) represent subevent connectives in the Jackendoff-Dowty-Vendler tradition, while variables represent participant roles. Constants are represented by the italicized material in angled brackets. I have augmented the Rappaport Hovav and Levin inventory of event templates in order to represent Aktionsart classes and event properties which, while having no direct relevance to verbal argument structure, figure prominently in aspectual type-shifts. The class of state phases has been added and the class of processes split into two classes: homogeneous and heterogeneous activities. The state-phase template, as shown, contains the operator HOLD. This operator combines with a stative situation type to yield a state which begins and ends within the reference interval. The homogeneous-activity template, as shown, also contains the operator HOLD. In this template, however, HOLD takes two arguments: a state radical and an effector. The effector argument is also an argument of the state radical; this notation reflects the fact that the subject denotatum, although nonagentive, is responsible for the maintenance of the denoted state. The template for heterogeneous activities contains the operator REPEAT. This operator has the same valence and ''control'' properties as HOLD in the homogeneous-activity template. The use of the REPEAT operator captures the observation that heterogeneous activities, e.g., *skip*, consist of iterated type-identical events. Since a heterogeneous activity is itself an event, a heterogeneous activity may replace the event variable in the heterogeneous-activity template. The resulting event is an event chain, or, equivalently, a heterogeneous activity. As in Rappaport Hovav and

Levin's original model, the achievement template properly includes the state template, while the accomplishment template contains the templates for activities, achievements and states, respectively.

Rappaport Hovav and Levin propose a single mechanism of semantic derivation, template augmentation: ''Event structure templates may be freely augmented up to other possible templates in the basic inventory of event structure templates'' (1998: 111). The added structures are the subevents represented by operators, e.g., BECOME. Template augmentation involves the unification of Aktionsart representations. Through template augmentation, an event-structure template, e.g., the heterogeneous-activity template, projects that event–structure representation by which it is entailed—the accomplishment template. Template augmentation thereby drives verbal valence augmentation at the syntactic level. For example, the verb *sweep* has both a monovalent activity pattern (*She swept for hours*) and a trivalent accomplishment pattern, in which it denotes causation of motion (*She swept the dust off the steps*); the accomplishment template licenses both the direct object and locative oblique.

Template augmentation is a more constrained operation than unification, in two respects. First, augmentation allows only pairwise unifications. Second, augmentation is limited to the addition of a single subevent, as expressed by an operator and the arguments it projects. For example, although accomplishment and state templates overlap, creating an accomplishment template from a state template would entail the addition of two subevents: that headed by BECOME and that headed by CAUSE. One can, however, build an accomplishment representation from an activity representation: this entails the addition of a single subevent, represented by the operator CAUSE and its two situation-type arguments, an activity radical and an achievement radical. The first argument unifies with the representation of the input type. In the very same way, one can build an accomplishment representation from an achievement representation: CAUSE and its activity-radical argument count as a single subevent, or *component*, of causal representation. In this case, it is the second argument of CAUSE which unifies with the representation of the input type. We will assume that the two foregoing constraints are operative in aspectual mapping as well.

2.2.2.   *Temporal representation.*   Temporal representation captures the patterns of stasis and change which characterize each situation type. Temporal representations do not, for example, represent causal links between contiguous situations or agentive implications attaching to certain participants. Table 2 gives temporal representations for each of the six Aktionsart classes discussed above. These representations utilize three

Table 2.   *Temporal representation (based on Bickel 1997)*

Aktionsart class	Temporal representation
State	ϕ
State phase	$\tau\ \phi\ \tau$
Homogeneous activity	$\tau\ \phi\ \tau$
Heterogeneous activity	$\tau\ \phi\ [\tau\ \phi]^+\ \tau$
Achievement	$\tau\ \phi$
Accomplishment	$\kappa\ \tau\ \phi$

situation-type components: states (ϕ), transitions (τ), and event chains (κ). States are internally homogeneous situations which include no transitions (i.e., temporal boundaries). For this reason, we say that states *include* the intervals at which they hold (Partee 1984; Herweg 1991). Transitions are state-change events, and as such are isomorphic to achievements. However, the category of transitions is not limited to those inchoative events which are lexicalized as achievement verbs, since it also includes the events of *inception* and *cessation*, which jointly define the endpoints of a situation. For example, the endpoints of sleeping, a homogeneous activity, are, respectively, the events of falling asleep and waking up. Unlike states, transitions cannot stand alone, nor can they be iterated without the mediation of a state. Accordingly, the representations *$[\tau]$ and *$[\tau\ \tau]$ are ill formed (Bickel 1997: 126). By contrast, the representation $[\tau\ \phi\ \tau]$ is well formed; it corresponds to both a state phase and a homogeneous activity (recall that agentive properties are invisible to temporal representation). When the representation $[\tau\ \phi\ \tau]$ is iterated it corresponds to an event chain or heterogeneous activity (κ). The representation corresponding to heterogeneous activities contains the notation $[\tau\ \phi]^+$, denoting one or more instances of particular state change, e.g., that of crossing from one side of the room to another in an event of pacing. While both heterogeneous activities and homogeneous activities can be protracted indefinitely, the mechanisms are different in each case. In the former case, expansion entails iteration, while in the latter expansion simply entails lack of change. Notice, however, that in neither case does expansion have any effect upon bounding: the initial and final transitions are present whatever intervenes between them. When a heterogeneous activity is embedded in an accomplishment representation, shown in Table 2 as $[\kappa\ \tau\ \phi]$, its offset transition is superimposed upon the initial transition of the embedded achievement, $[\tau\ \phi]$. This reflects the observation that, for example, in an event of walking home, the threshold-crossing transition is also the final step of the walk.

The constraint which rules out sequences of the form *[τ] and *[τ τ] need not be stipulated, since one cannot logically conceive of an inchoative event which is unaccompanied by a resultant state. Notice, however, that in the temporal representations given in Table 2 resultant states are not consistently indicated. In particular, states which follow events of termination are missing from the representations. These states are not indicated because they can be "read in" on the assumption that transitions are isomorphic to achievements. Notice, however, that *antecedent* states are equally crucial to the definition of transition, and our temporal representations lack these as well. Let us assume, therefore, that antecedent states and consequent states—as well as periods of stasis which lie *between* chained events—can be subsumed under the rubric of *rests*. The term *rest* is meant to be construed as it is in rhythmic representation: a pause between "beats", or transitions. While in the foregoing remarks I have distinguished intermediate states from antecedent and consequent states, this distinction is not particularly meaningful: because events are located with respect to one another on a time line, all events potentially qualify as chained events and all states can be construed as intermediate states. This point will become particularly relevant when we consider chained events which represent habitual and generic situations.

2.3.   *Aspectual type shifts as operations on Aktionsart structure*

In the coercion literature, semantic type-shifts are typically conceived as substitution operations. By contrast, current models of derivational relations are based upon shared word-internal structure (Bybee 1995). It seems desirable to narrow this gap. We would not, for example, generally embrace a model of irregular past-tense formation in English which was based entirely upon suppletive relations. Such a model would capture associations but not generalizations. Therefore, I propose an alternative framework for aspectual mapping based upon structure sharing. In this framework, all aspectual mappings are subject to a principle which I will refer to as Aktionsart preservation. This principle is described in (14):

(14)   *Aktionsart preservation*. In an aspectual mapping, whether implicit or explicit, input and output types must share some portion of their respective causal and/or temporal representations.

This requirement governs two kinds of operations upon Aktionsart structure: permutation (to be described in 2.3.1) and concatenation (to be described in 2.3.2).

2.3.1.   *Permutation*.   Permutation operations add or select a single component of the input Aktionsart representation. The definition of

component differs according to whether we are using causal or temporal representation. In causal representation, a component corresponds to an operator, e.g., HOLD, and the arguments it projects. In temporal representation, a component corresponds to a state, transition, or event chain. As an example of addition, consider the transition from state to achievement. This type shift occurs implicitly when, for example, a frame adverbial is combined with a state radical, as in (2), repeated here as (15):

(15)   They were bored in a few seconds.

This type shift involves the addition of the operator BECOME, or, equivalently, a transition, to the causal or temporal representation of the state.[2] As an example of selection consider the explicit type shift performed by the copular resultative construction in English:

(16)   a.   The truck is loaded.
       b.   The soup is cooled.

The resultant-state predications in (16a–b) denote states, or more specifically those states which are embedded in the Aktionsart representations of their participial complements. These states are, respectively, that of the truck being full and that of the soup being cool. The stative type shift performed by the resultative construction involves selection of the state component in the causal or temporal representation of the lexical verb. Since both the accomplishment verb *load* and the achievement verb *cool* entail a resultant state, the application of selection conforms to Aktionsart preservation. Notice, however, that the type shift exemplified in (16a) is not incremental: states and accomplishments differ by more than a single component of Aktionsart representation, since the accomplishment entails two subevents which the state does not.

   Certain permutation operations appear to violate Aktionsart preservation. These violations are in fact only apparent, since the relevant mappings are actually mapping chains—ordered pairs of mappings, the first of which feeds the second. I will refer to these chained mappings as indirect type shifts since they involve the mediation of a third aspectual category. Indirect type shifts exist because semantic transitions, as equivalence relations, are transitive; that is, if A=B and B=C then it follows that A=C. Indirect type shifting will be invoked below in the analysis of the progressive. The progressive, as I will argue, maps activity radicals onto state radicals. A consequence of this analysis is that coercion is involved in the interpretation of (17):

(17)   She was winning the race when she got tripped.

For Dowty (1986: 42) sentences like (17) suggest that achievements are not intrinsically punctual. I will suggest instead that the source of the durative implication in (17) is not the denoted achievement radical but an implicit type shift whose output type is an activity. This mapping, whether it is accomplished by addition or selection, appears to violate Aktionsart preservation at the level of causal structure, since heterogeneous-activity and achievement representations have no shared subevents. As we will see in section 5.2.1, however, the interpretation of progressive-form achievement predications involves a chained mapping. The relevant mapping is mediated by a third Aktionsart category—that of accomplishments. The accomplishment representation is derived from the input achievement radical via augmentation; application of selection to the intermediate output type yields the activity representation required by the progressive construction. This analysis accounts for our intuition that progressive-form achievement predications are construed as denoting effected rather than manifested results.

2.3.2. *Concatenation.* The concatenation operation is roughly similar to the repetition operations assumed by a number of aspectual theorists (Jackendoff 1997: 51–52; Bickel 1997: 117–119; De Swart 1998: 361–362), but there are crucial differences between concatenation, as envisaged here, and these antecedent notions. Like other mappings in the general class of repetition operations, concatenation applies to an event type (i.e., dynamic situation radicals), and outputs a series of events which are identical in type both to one another and to the input event. In addition, like other iteration operations, concatenation is used to represent both implicit and explicit type shifting, e.g., coerced readings triggered by frequency adverbials. The difference between concatenation and its predecessor notions lies in the nature of the output type. While repetition operations are typically assumed to output state types, concatenation instead outputs an event chain, which, as discussed above, qualifies as a heterogeneous activity rather than a state. The identification of event chains with heterogeneous activities is an independently motivated one, since, as has been widely observed, telic verbs with multiplex complement denotata receive activity readings. Note, for example, the contrast between the sentence *She ate mushrooms*, which asserts an activity, and the sentence *She ate a mushroom*, which asserts an accomplishment. Further, as Smith observes (1997: 51), the syntactic properties of habitual predications suggest that they are event predications: they can appear in imperatives, with agent-oriented adverbials like *deliberately*, and in pseudo-cleft constructions. The syntactic constructions in question do not in general appear capable of coercing perfective readings

of stative predications: sentences like (18a) and (18b) are awkward at best:

(18) a. ??What she did was prefer white wine
      b. ??Prefer white wine!

Finally, by rejecting the assumption that repeated events are ipso facto stative, we avoid the logical paradox alluded to in section 1: situations which consist of multiple type-identical subevents, e.g., pacing, qualify as dynamic situations rather than states; it is not obvious therefore why event radicals which otherwise qualify as unique events receive coerced repeated-event interpretations in morphosyntactic contexts which call for state radicals. Two such contexts are illustrated in (5), repeated here as (19):

(19) a. She smokes.
      b. She smoked when I met her.

A possible solution to the paradox is suggested by Langacker (1996): while iteration is sufficient for a stative construal, it does not *entail* a stative construal, since repeated events may be also be construed perfectively. But Langacker does not explain precisely *why* habitual predications invite stative construals. It cannot be, for example, that habitual predications, like states, necessarily denote unbounded situations, since, as Langacker observes (1996: 292; emphasis in original), habitual and generic predications can denote situations which hold "for either a bounded or an unbounded span of time, i.e., their validity has a temporal *scope*". If habitual predications can be either perfective or imperfective, what then is the basis for distinguishing between iterated-event sentences and habitual-event sentences?

According to Langacker, iterated events and habitual events have distinct implications for our theories of the world. He describes these implications using Goldsmith and Woisetschlaeger's (1982) distinction between *structural* and *phenomenal* knowledge. Phenomenal knowledge is akin to awareness. Iterated-event predications, like other kinds of episodic predications, express *actual* events—those which impinge upon consciousness. Structural knowledge is akin to pattern recognition. Habitual sentences express *structural* events—those whose recurrence can be predicted on the basis of world knowledge. Structural events are also conveyed by *gnomic* sentences, e.g., *Oil floats on water* or *A periodontist treats gum disease*, and many aspectual theorists, including Krifka and coauthors (1995), conflate habitual and gnomic sentences under the general rubric of *generic* sentences. In accordance with Krifka et al (1995)

and Bybee, Perkins, and Pagliuca (1994: 152), we will assume that the differences between habitual sentences (which Krifka and coauthors refer to as *characterizing sentences*) and gnomic sentences (which Krifka et al refer to as *reference to types*) can be traced to characteristic properties of nominal reference. Nominals in gnomic sentences have attributive reference, leading to contingency readings. For example, one can paraphrase the sentence *Oil floats on water* by means of a conditional sentence: if there is something that counts as oil, it will float on whatever substance qualifies as water. Habitual sentences do not have contingency readings, since such sentences attribute properties to specific entities. However, both gnomic and habitual sentences express nonincidental facts. The question before us is whether the structural–actual (or, equivalently, generic–episodic) distinction is relevant for aspectual coding. There is evidence to suggest that it is not. Generic sentences appear to be recognized as such only on the basis of a mismatch between perfective verbal Aktionsart and the morphosyntactic context in which that verb appears. For example, Bybee, Perkins, and Pagliuca (1994), in motivating a grammatical category of present habitual sentences, observe that

the difference between habitual and present stative resides entirely in the lexical meaning of the predicate: the present habitual reading of dynamic predicates covers many different instances of the same situation, while the present stative covers one continuous situation. (1994: 152)

It therefore appears appropriate to conclude that generic meaning is a specific type of coercion effect, achieved by combining an event-chain radical with a state-sensitive construction.

I propose to treat the connection between genericity and stativity as an inferential one: an iterated, temporally stable situation which is also construed as including reference time (whether past or present) will invariably be construed as gnomic/habitual. From this correlation, however, we cannot conclude that genericity entails stativity, since perfective sentences can also express structural events. Rather, this correlation suggests that genericity is a contextual inference, and one which is based upon a semantic prototype. The generic–episodic distinction is a contextual one, in part because it hinges on inferences about the size of the relevant time scales. If the intervals separating the events are judged to be small, as in the case of *The light flashed*, the predication will be judged as episodic; if the relevant events are judged to be widely dispersed through time, as in *The Romans laid siege to Gallic cities*, the predication will be judged generic. Since, as Talmy (1988) has established, grammatical

meanings are magnitude neutral, magnitude-dependent semantic distinctions, like the generic–episodic distinction, look much more like pragmatic inferences than grammatical categories. The generic–episodic distinction is prototype-based because generic meaning is multidimensional: the "best" examples of generic sentences not only invoke large time scales but also qualify as states. Why should this be? When a situation is reported as including the reference time, as states are, nothing preempts the inference that this situation also holds at times prior to and subsequent to the reference time. An interpreter who is placed "inside" a situation in this way is therefore free to conclude that the situation is a fact about the world rather than merely incidental, but this inference is simply a property of state predications—the subinterval property.

It follows from the foregoing observations that habitual-event radicals and iterated-event radicals are indistinguishable at the level of Aktionsart structure: both qualify as heterogeneous activities. Accordingly, the concatenation operation takes us only part of the way toward a stative interpretation; it yields a heterogeneous activity. It is at this juncture that perfective and habitual meanings are compatible. The permutation operation of selection provides the ultimate bridge to stative meaning: since iterated events contain intermediate rests, and since such rests qualify as states, those type shifts which require stative input types (whether implicit or explicit) are free to select intermediate rests. An intermediate rest has no fixed size: the stative predications *Mothers' Day falls on Sunday* and *My mother calls on Sunday* denote event chains whose intermediate rests are, respectively, a year and a week. However, the same can be said of reference time, which is extensible in the manner of other deictic anchors, e.g., the adverbs *here* and *now*.

By equating intermediate rests with states we explain an otherwise puzzling property of present-tense habitual predications. While it is generally said that present sentences report situations ongoing at speech time, the event radical denoted by a habitual predication need not literally overlap speech time. For example, a speaker can truthfully utter the sentence *She smokes* whether or not the person described happens to be smoking at the moment of speech. Under the present analysis of present habitual sentences, this interpretive fact is explained: the situation which is treated as ongoing at speech time is not that denoted by the verb and its arguments; rather, it is a state which lies between any two occurrences of the type denoted by the event radical. That this currently ongoing state qualifies as an intermediate rest and not, for example, a *final* rest is not literally verifiable at speech time, but the speaker appears willing to treat it as such, just as one may report a state as ongoing at speech time without direct sensory evidence, e.g., *My car is parked downstairs.*

3.   Coercion as operator insertion

Jackendoff (1997) proposes that syntactically transparent composition, as represented by the lexical-licensing approach, is a default within a wider array of options, which he refers to as enriched composition. The aspect of enriched composition which pertains to the modeling of coercion effects is described as follows:

The conceptual structure of a sentence may contain, in addition to the conceptual content of its [lexical-conceptual structures], other material that is not expressed lexically, but that must be present in conceptual structure ... in order to achieve well-formedness in the composition of the LCSs into conceptual structure. (1997: 49)

This model provides an elegant way of describing coercion effects like that involving the indefinite article, e.g., *a beer*. When an entity in conceptual structure is not a suitable argument for a functor, F,

The process of composition interpolates a ''coercing function'' G to create instead the structure F(G(X)), where X is a suitable argument for G, and G(X) is a suitable argument for F. (1997: 53)

In the case at hand, the coercing function would have the effect of deriving a count type from a mass type, making *beer* a suitable argument for the operator represented by the indefinite article. The interpolated-function model successfully extricates the two head properties mentioned above—that of being a syntactic head, i.e., determining the distributional properties of the phrasal projection, and that of being a semantic head, i.e., calling for an argument of a particular type (Zwicky 1985; Croft 1996). In other words, the indefinite article, while it does not determine the syntactic distribution of its phrasal projection, can nevertheless be said to ''ask for'' a nominal sister denoting a bounded entity. The interpolated function would have the effect of providing the required type of argument for the indefinite article. Thus, for example, the determiner *some*, which requires an unbounded entity as its argument, can trigger the interpolation of an operator whose effect is to derive an unbounded type from a bounded one, as in *some fish*. (De Swart's 1998 model of coercion effects is relevantly similar.)

   In representing the semantic constraints imposed by nonheads, enriched composition makes it possible to describe a wider array of interpretive phenomena than does strict composition alone. However, on Jackendoff's account, there is no obvious relationship between strict and enriched composition. The two models of interpretation are different in

kind, since enriched representations do not appear to owe anything to the syntactic configurations in which the particular functor appears. Jackendoff makes clear that enriched composition is an operation which occurs at the level of conceptual structure—one which he admits considerably complicates the interface between syntactic structure and conceptual structure (1997: 50). He also raises the possibility that rules of enriched composition might ''insert arbitrary material into arbitrary arrangements'' (1997: 50). De Swart (1998: 361) seeks to avoid such overgeneration by assuming that a coercion operator is introduced only when there is a trigger for it. This strategy leads one to question what the triggers are. De Swart does not identify them, but throughout her exposition the triggers are specific linguistic expressions, e.g., durational adverbials like *for eight hours*, which when combined with a perfective predication like *John play- the sonata* trigger the insertion of an imperfectivizing operator, whose natural interpretation in this context involves iteration. But by enabling a given (linguistically expressed) operator to invoke a given coercion operator on an ''as needed'' basis we do not thereby ensure that this coercion operator will appear *only* where needed. What, for example, is to prevent an imperfectivizing operator from applying to an event radical where it should not? What is to prevent us from proposing, for example, that it has applied in the interpretation of a sentence like *John played the sonata last night*, yielding a (highly implausible) iterative reading? Coercion effects may be morphosyntactically invisible, but if their representation owes nothing to morphosyntax it is not obvious how one can constrain the application of the operators used to model the effects.

An additional aspect of the indexing problem involves *gaps* in the system of coercion operators. The modular approach to coercion cannot obviously account for the failure of a given language to employ a given aspectual coercion operator. De Swart points out (1998: 363, fn. 12) that English lacks an ''imperfectivizing'' coercion operator C_{ds}, and attributes this gap to the fact that English lacks grammatically expressed aspectual operators that require nondynamic eventualities as input. If an approach is truly modular, however, the existence of an element of semantic representation should not depend upon facts about the grammatical inventory. Modularity further prevents us from using morphosyntactic facts as a basis for distinguishing among elements of semantic representation. While De Swart draws several principled distinctions between morphosyntactically expressed eventuality-type shifters (e.g., the progressive) and coercion operators (1998: 360), in semantic representation the two types of functors are per force identical, whatever ad hoc notational conventions one might use to distinguish them. In light of the foregoing considerations, it seems reasonable to abandon approaches in which coercion

takes place in a "semantics module". Since construction-based models of syntax have already been shown to provide concrete models of exocentric licensing phenomena, including those involving argument structure, it is a short intuitive leap to the conclusion that aspectual coercion effects arise from the interpretive instructions provided by symbolic syntactic patterns.

4.   Coercion via construction

The means by which we model the combination of constructions with lexical items is unification, as described by Fillmore et al (to appear) and Kay and Fillmore (1999). Unification of constructions can grossly be described in terms of a metaphor involving the superimposition of slides. A lexical entry can be superimposed upon a construction (or vice versa) as long as the semantic and syntactic specifications on each slide "show through"—that is, provided there is no conflict among the specifications on the slides in the stack. The specifications take the form of attribute-value matrices: a list of syntactic (*syn*) and semantic (*sem*) attributes (both relational and intrinsic) with exactly one value assigned to each (including the value [ ], or unspecified).[3] Among the values of the *sem* attribute are the attributes *index* and *frame*. The value of the *index* attribute is the referential index of the expression. The value of the *frame* attribute is the set of relations and participant roles which jointly define the type of the expression. The constructions themselves are represented as box diagrams. Each box corresponds to a node in a tree-structure representation, and contains an attribute-value matrix. In a branching construction, a lexical entry unifies with a single daughter box within the construction. The topmost attribute-value matrix of the construction represents the external syntax and semantics of the construction—that is, what instances of this construction "count as". The traditional conception of a lexical head—as the determinant of the syntactic category and semantic type of its projection—plays a limited role in this model, as a default.[4]

Unification is used to represent a semantic dependency between two or more types which figure in the statement of a construction. When there is a concord requirement within a branching construction, the two daughter boxes will contain identical values for the relevant attributes. When a range of values is possible, a concord requirement will be indicated by a unification variable, a numbered pound sign # preceding the empty brackets, e.g., #1. For example, each of the two daughter constituents in the determination construction (the article and the nominal head) carries the attribute-value pair *plural #[ ]*. This concord requirement rules out

such tokens as *these person* and *this persons*. Functor-argument relations are represented by the *valence* attribute. The value of the valence attribute is the set of arguments which a lexical daughter (or its projection) requires, with intrinsic and relational information given for each member of the valence set. An argument of a functor (e.g., a verb) is represented as the daughter which unifies semantically with a member of the valence set of its sister, the functor. While some implementations of unification-based construction grammar, e.g., Kay and Fillmore 1999 (as described in note 1), equate any failure of unification with ill formedness, I assume a coercion mechanism whereby constructional requirements (e.g., semantic constraints upon the head daughter) ''win out'' over lexical features when the lexical item and construction have different values for a given attribute. This accommodation mechanism, which I will refer to as the override principle, is described in (20):

(20)   *The override principle*. If a lexical item is semantically incompatible with its morphosyntactic context, the meaning of the lexical item conforms to the meaning of the structure in which it is embedded.

Under (20), coercion is a side effect of the ordinary semiotic function of grammatical markers rather than a special form of composition. Further, (20) targets a broader array of phenomena than do models based on the interpolation of coercion operators. Notice that the override principle refers to semantic incompatibility between a lexical item and its syntactic context, rather than merely to the lack of conformity between a particular lexical item and a given grammatical formative, e.g., the indefinite article. In construction-based syntax, meaning-bearing grammatical units like the indefinite article and plural suffix are seen as the semantic heads of *partially lexically filled constructions*. This means that grammatical formatives are also grammatical constructions, and the override principle subsumes the classic cases of coercion. In addition, however, the override principle also explains the source of coercion effects which cannot plausibly be represented in terms of functor-argument relations. These effects involve constructions which do not invoke specific lexical items. Salient among these constructions are argument-structure constructions, as described by Goldberg (1995) and Michaelis and Ruppenhofer (2001). Argument-structure constructions create mismatches between the event type denoted by the head verb and the event type denoted by the clause. Examples of such mismatches are given in (21) and (22):

(21)   It worked, sir! We *bored* them right out of the game. (Marcie, *Peanuts*, October 1997)

(22) Down at the harbor there is a teal-green clubhouse for socializing and parties. Beside it *sparkles* the community pool.... (Bryan Burrough, ''Trouble Next Door'', *Vanity Fair*, August 2001)

In (21), the verb *bore*, which is otherwise a bivalent verb licensing stimulus and experiencer roles, assigns an agent, a theme, and a goal. Accordingly, the sentence has a construal in which boring is a means of propulsion. In (22), the verb *sparkle*, otherwise a monovalent verb which licenses a theme argument, licenses both a location argument and a theme argument. In this presentational construction, traditionally known as *locative inversion*, the verb *sparkle* is construed as denoting both a manner and a located state, and the theme argument, denoted by the noun phrase *a community pool*, denotes a focal referent. Under Goldberg's model, the enriched meanings in (21) and (22) result from the combination of the verb with argument-structure constructions which denote, respectively, a caused-motion event and a state of location. In each case, the valence set licensed by the construction properly includes the valence set licensed by the verb. The combination of verb and construction results in augmentation of the verbal valence, and reconstrual of the verb's arguments according to semantic-coherence constraints: compatible thematic roles are fused; the nonfused thematic roles are those contributed exclusively by the construction (Goldberg 1995: 50–51). Valence augmentation is an entailment of sign-based syntax: since constructions denote event types they must also be capable of assigning thematic roles above and beyond those contributed by the verb.

Because they invoke causal Aktionsart representations, argument-structure constructions share semantic properties with aspectual constructions. Formally, however, aspectual constructions most closely resemble nominal constructions, since both nominal and aspectual constructions invoke specific words or affixes. Therefore, I will demonstrate the mechanics of unification by reference to nominal syntax. This illustration will focus on two basic nominal constructions of English: the indefinite determination construction and the plural construction. In (23) and (24), we see two pairs of nominal constructs; each pair illustrates one of the two respective constructions. In each pairing, the (a) construct illustrates instantiation of constructional meaning while the (b) construct illustrates implicit type shifting:

(23) a. She read *a book*.   (lexical match)
      b. Did you eat *a pudding?*   (lexical mismatch)

(24) a. She bought some *pencils*.   (lexical match)
      b. They serve delicious *soups*.   (lexical mismatch)

syn [cat N, max+]

sem [index #1, frame [bounded +, cnfg count, num sg]]

syn [cat det, function spec]

val { [[syn [cat N, max-], sem [index #1, frame [bounded+, cnfg count, num sg]]]] }

syn [cat N, max-, function head]

sem [index #1, frame [bounded+, cnfg count, num sg]]

phon *a*
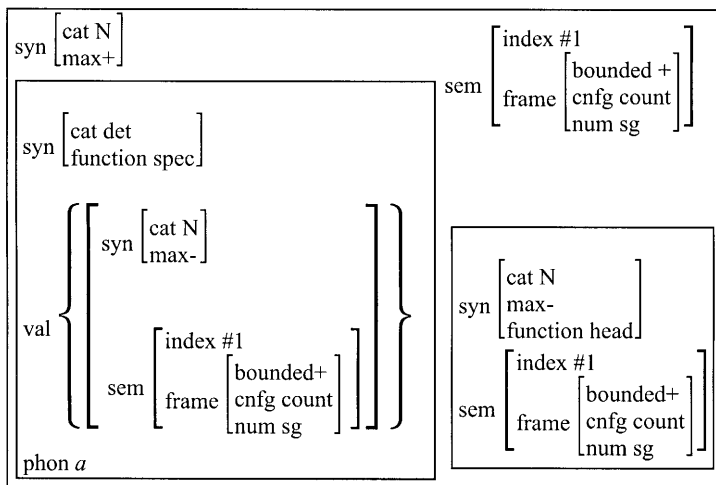
Figure 2.   *The indefinite determination construction*

The indefinite determination construction is given in Figure 2. In Figure 2, we see that the indefinite article has a valence requirement calling for a noun with specific values for the attributes boundedness, configuration, and number. These values are required to match those of the nominal sister. The nominal sister is the syntactic head, but its semantic type is restricted by its sister. The construct *a book* in (23a) transparently reflects the semantics of the construction: the input lexical item shares semantic feature values with the right daughter of the construction. By contrast, the construct *a pudding* in (23b) illustrates a context of coercion: the noun pudding denotes a mass entity and therefore fails to unify with the construction's right daughter. In accordance with the override principle, the relevant feature values of the input noun will switch to those required by the construction. This means that mass nouns like *pudding* will receive the value [count+] in combination with the indefinite determination construction.

The plural construction is shown in Figure 3.[5] Like indefinite determination, the plural construction is binary branching. And like the indefinite article, the plural suffix has a valence requirement which calls for a nominal sister having particular values for the attributes boundedness, configuration, and number. The nominal sister shows these same values. Here, the functor's requirements are captured through unification of the semantic features of functor and argument. However, there is no case in which the input lexical item and the construction itself will share all

$$
\begin{bmatrix}
\text{syn} \begin{bmatrix} \text{cat N} \\ \text{max [ ]} \\ \text{lex+} \end{bmatrix} & \text{sem} \begin{bmatrix} \text{index \#1} \\ \text{frame} \begin{bmatrix} \text{bounded-} \\ \text{cnfg count} \\ \text{num pl} \end{bmatrix} \end{bmatrix} \\[2em]
\begin{bmatrix} \text{syn} \begin{bmatrix} \text{cat N} \\ \text{max-} \\ \text{lex+} \end{bmatrix} \\ \text{sem} \begin{bmatrix} \text{index \#1} \\ \text{frame} \begin{bmatrix} \text{bounded+} \\ \text{cnfg count} \\ \text{num sg} \end{bmatrix} \end{bmatrix} \end{bmatrix} &
\begin{bmatrix} \text{syn [cat suffix]} \\ \text{val} \left\{ \begin{bmatrix} \text{syn} \begin{bmatrix} \text{cat N} \\ \text{max-} \\ \text{lex+} \end{bmatrix} \\ \text{sem} \begin{bmatrix} \text{index \#1} \\ \text{frame} \begin{bmatrix} \text{bounded+} \\ \text{cnfg count} \\ \text{num sg} \end{bmatrix} \end{bmatrix} \end{bmatrix} \right\} \\ \text{phon -s} \end{bmatrix}
\end{bmatrix}
$$

Figure 3.   *The plural construction*

values for the relevant *sem* features. (By *relevant* here I mean the set of *sem* features which excludes the referential index.) The plural construction *shifts* the boundedness value of the input noun to [bounded−], producing forms like *soups* in (24b). Unlike the indefinite determination construction, the plural construction performs two kinds of type shift— one to which it is dedicated (an explicit type shift) and one which is a side-effect of its dedicated function (an implicit type shift). The two kinds of mappings are defined in (25) and (26):

(25)   *Explicit type-shifting.* A shift in the designation of a lexical item (or its projection) by a grammatical construction with which that lexical expression is conventionally combined.

(26)   *Implicit type-shifting.* A shift in the designation of a lexical item (or its projection) in order to reconcile semantic conflict between word and construction, in accordance with the override principle (20).

Constructions which inherently perform type shifts differ from those which do not inherently do so. We capture this difference by drawing a distinction between *concord* and *shift* constructions:

(27)   *Concord construction.* A construction which denotes the same kind of entity or event as the lexical expression with which it is combined. In the case of branching constructions, the construction and its lexical daughter have the same values for the relevant semantic features. Examples include indefinite determination, *SM*-determination.[6]

Table 3.   *Comparison of the two types of constructions*

	Implicit type-shifting	Explicit type-shifting
Concord constructions	Yes (via [20])	No
Shift constructions	Yes (via [20])	Yes

(28)   *Shift construction*. A construction which denotes a different kind of entity or event from the lexical expression with which it is combined. In the case of branching constructions, the construction and its lexical daughter have different values for the relevant semantic features. Examples include the partitive and the plural.

While the plural is a shift construction, it has something crucial in common with concord constructions like indefinite determination: it requires semantic agreement between its two daughters with regard to the boundedness, configuration, and number attributes. When the input noun does not match the semantic feature values requested by the plural suffix, the result is coercion. As per the override principle, conflict is resolved in favor of grammatical meaning. Table 3 compares the two types of constructions.

Table 3 shows that the two types overlap in function, since both types perform implicit type shifting. Why should this overlap exist? In the case of functor–argument relations, whose constructional analog is syntactic sisterhood, the basis of this overlap is easy to see. Both concord and shift constructions have unification requirements which involve semantic agreement between daughters. Since the override principle, as a constraint on conflict resolution, is potentially operative wherever a construction cross-lists semantic requirements, the principle necessarily applies to shift constructions as well.

By means of the semantic features boundedness, number, and configuration, the two nominal constructions discussed in this section invoke fundamental properties of an entity's distribution in space. Given the fundamental analogy between space and time (Jackendoff 1983, 1990; Talmy 1988), aspectual theorists have been inclined to exploit the parallels between entities, which occupy space, and situations, which obtain or occur over time. The assumption that there are parallels between mass entities and states, on the one hand, and count entities and events, on the other, has been fundamental to aspectual explanation (Mourelatos 1978; Langacker 1987, 1991). And since nominal morphosyntax is used to perform both implicit and explicit type shifting, it is plausible to assume that aspectual morphosyntax functions in this way as well. In the next section,

we will develop a construction-based model of those semantic mappings which involve the event–state distinction.

5.   Aspectual coercion via construction

As we have seen, constructions denote semantic types. This means that when a concord construction and a shift construction denote the same semantic type, the two constructions can be used to perform the same type shift. In the domain of nominal syntax, for example, both the partitive construction and indefinite determination can be used to denote portions, as in *a cup of coffee* versus *a coffee*. In the domain of aspectual syntax, there are analogous functional overlaps. These can be identified not only within the grammar of a given language but also typologically. As I will argue, the shift–concord distinction provides a revealing model of partial overlap among exponents of imperfectivity in English and Romance. The following discussion will presuppose the general characterization given in section 1 to the coercion cases exemplified in (1) to (6). These examples are repeated here as (29) to (34):

(29)   *I* was *outside* twice.
(30)   *They* were *bored* in a minute.
(31)   *I* am *liv*ing *on Pearl Street*.
(32)   *I* have *liv*ed *on Pearl Street*.
(33)   *She smoke*s.
(34)   I peered through the curtain. *Sue seem*ed *upset*.

The coherence of these combinations makes sense only under the general presumption that aspectual operators like frame and frequency adverbials, the progressive, and the perfect ensure that they receive the proper situation-type arguments. As we have seen, there are two different ways of describing the means by which aspectual operators accomplish this. On one type of account (that offered by Jackendoff and De Swart), coercion operators bridge the gap between the functor's requirements and the argument's semantics. On another type of account, the construction-based model, constructions can alter what words (and their syntactic projections) designate. In the first type of model, coercion is taken as evidence of modularity, since the representation of a coerced meaning will always contain something which has no reflex in the relevant rule of morphosyntactic combination. In the second type of model, the representation of a coerced meaning will never contain anything that the corresponding rule of morphosyntactic combination does not. The relationship of a functor to its argument is a variable in the modular approach (since it may occasionally be mediated by an additional operator), while it is a

constant in the constructional approach. Lexical meaning is a constant in the modular approach, while it is a variable in the constructional approach. One can observe the variability of lexical meaning only by comparing the projection properties of a given lexical item across a variety of constructional environments; because—in accordance with the override principle—words adapt their semantic and valence properties to the particular constructions in which they are embedded, no single construct of the language will reveal the occurrence of a type shift. For this reason, sentences like (35) to (40) have representations which are isomorphic to those of sentences like (29) to (34) despite the fact that in the latter example set the relevant aspectual constructions have contributed nothing to construal that is not contributed by the words of the sentence. As in (29) to (34), situation radicals are shown in italics:

(35) *Julia call*ed twice today.
(36) *They g*ot *bored* in a minute.
(37) *I* am *fix*ing *the problem*.
(38) *They* have *install*ed *some track lighting*.
(39) *She prefer*s *white wine*.
(40) *She walk*ed *out*.

The example set (29) to (34) contains three pairings, each of which corresponds to a distinct class of aspectual constructions: aspectual concord constructions are exemplified in (29) and (30), aspectual shift constructions in (31) and (32) and aspectually sensitive tense constructions in (33) and (34). Aspectual concord constructions will be discussed in 5.1, aspectual shift constructions in 5.2, and aspectually sensitive tense constructions, in both English and French, in 5.3.

5.1.   *Aspectual concord constructions*

5.1.1.   *The frequency adverbial construction*.   The frequency adverbial construction is shown in Figure 4. This construction is an adjunct-licensing construction as described by Kay and Fillmore (1999: 11–12). Adjuncts and arguments are licensed in distinct ways in this model. While arguments are valence elements of the minimal lexical verb, adjuncts are contributed by particular constructions which unify with a lexical verb entry, augmenting the verbal valence. The result is a verb entry, rather than a branching structure. This flat representation appears justified in light of the fact that we find no strong evidence for the recursive branching V′ structures that have traditionally been used in X-bar models to represent strings of adjuncts. In Figure 4, we see that the frequency adverbial construction adds an adverbial expression to the valence set of the
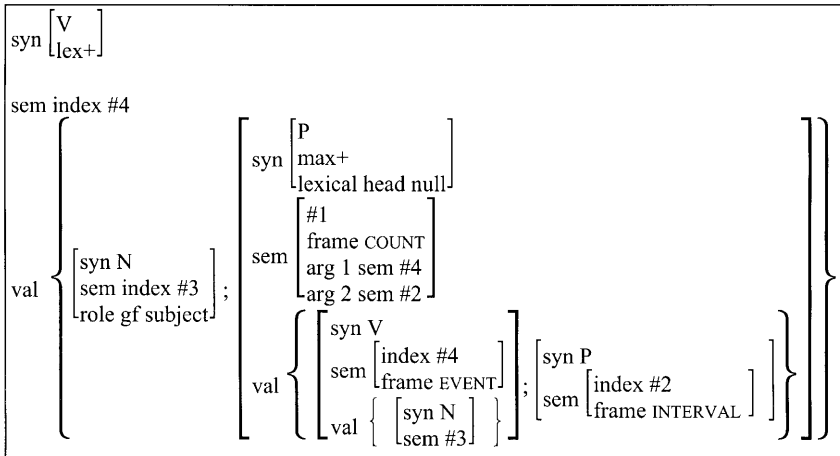
$$
\begin{bmatrix}
\text{syn} \begin{bmatrix} V \\ \text{lex+} \end{bmatrix} \\[2pt]
\text{sem index } \#4 \\[4pt]
\text{val} \left\{
\begin{bmatrix} \text{syn N} \\ \text{sem index } \#3 \\ \text{role gf subject} \end{bmatrix} ;
\begin{bmatrix}
\text{syn} \begin{bmatrix} P \\ \text{max+} \\ \text{lexical head null} \end{bmatrix} \\[4pt]
\text{sem} \begin{bmatrix} \#1 \\ \text{frame COUNT} \\ \text{arg 1 sem } \#4 \\ \text{arg 2 sem } \#2 \end{bmatrix} \\[4pt]
\text{val} \left\{
\begin{bmatrix} \text{syn V} \\ \text{sem} \begin{bmatrix} \text{index } \#4 \\ \text{frame EVENT} \end{bmatrix} \\ \text{val} \left\{ \begin{bmatrix} \text{syn N} \\ \text{sem } \#3 \end{bmatrix} \right\} \end{bmatrix} ;
\begin{bmatrix} \text{syn P} \\ \text{sem} \begin{bmatrix} \text{index } \#2 \\ \text{frame INTERVAL} \end{bmatrix} \end{bmatrix}
\right\}
\end{bmatrix}
\right\}
\end{bmatrix}
$$

Figure 4.   *The frequency adverbial construction. Examples:*
Instantiation: She visited twice
Implicit type-shifting: I was outside twice today.

lexical verb. This valence set minimally contains one additional valence member, that element whose grammatical function is subject. The adverbial element (modeled as a null-headed preposition phrase) itself has a valence structure. The first member of the valence set is an event expression, whose semantic index is identical to that of the verb itself. The second valence member is an oblique expression denoting an interval. The semantic frame expressed by the adjunct is one in which event occurrences are counted. This construction is a concord construction. The construction denotes a telic event and the valence set of the adverbial element calls for an event of this same type. This construction is unlike indefinite determination in that it is nonbranching: there are no boxes within it. Nonetheless, this construction projects a sisterhood relation and constrains this relation by means of an aspectual concord requirement, making it analogous to constructions like indefinite determination. As a concord construction, the frequency adverbial construction licenses constructs which are instances, as in (35), *Julia called twice today*. Cases of coercion are explicable according to the override principle. When combined with this construction, a stative verb will be construed as denoting a state phase, as in (29) *I was outside twice today*. The addition operation underlies this construal: the operator HOLD is added to the causal representation of the input state. This episodic construal reflects the interpreter's ability to reconcile the stative Aktionsart of the verb with the *event* feature invoked by the valence set of the preposition.

```
syn [V      ]
    [lex+   ]

sem index #4

                                          [syn [P                    ]]
                                          [    [lexical head in       ]]
                                          [                           ]
                                          [     [#1                  ]]
                                          [sem  [frame WITHIN        ]]
        [syn N          ]                 [     [arg 1 sem #4        ]]
val  {  [sem #3         ] ;               [     [arg 2 sem #2        ]]
        [role gf subject]                 [                                                                    ]
                                          [     [ [syn V                              ]                        ]]
                                          [val  { [sem [#4          ]                ] ; [syn N              ] ]
                                          [      [ [    [frame TELIC EVENT]           ]   [sem [#2          ]] ]
                                          [      [ [val { [syn N   ] }]               ]   [    [frame INTERVAL]] ]
                                          [      [ [    { [sem #3  ]  }]              ]                          ]
```

Figure 5. *The frame adverbial construction (concord). Examples:*
Instantiation: She solved the problem in ten minutes.
Implicit type-shifting: The program ran in ten minutes.
Implicit type-shifting: They were bored in ten minutes.

5.1.2. *The frame adverbial construction.* The frame adverbial construction is represented in Figure 5. It is an adjunct construction analogous to the frequency adverbial construction, and as such augments the valence of the lexical verb. The adjunct which is added to the verbal valence, a preposition phrase headed by *in*, is interpreted according to the logic of containment, as described in section 1. As discussed in that section, judgements of containment entail upward vis-à-vis intervals, and are therefore limited to those events which culminate within the relevant frame. Therefore, frame adverbials select exclusively for those event radicals which denote or entail a change of state. As a result, examples like (41) represent contexts of coercion:

(41) My radio program ran in less than four minutes.

De Swart observes (1998: 359) that examples like (41) allow both achievement and accomplishment readings. In (41), the frame adverbial *in less than four minutes* either denotes the running time of the program or the time during which the program began to air following some other event (say, a call to the radio station). These two readings involve distinct permutations of the input activity representation. Addition of an inchoative event to the causal structure of the input activity yields the accomplishment reading. The achievement reading, by contrast, results from selection: the event selected is the onset phase τ in the temporal representation of the input activity; this onset phase likewise counts as an inchoative event.

The semantic representation of the construction is captured by the semantic frame labeled WITHIN. This frame has two arguments: a telic event and an interval. These arguments are coindexed with linguistic expressions listed in the valence set of the preposition *in*. As a concord construction, the frame adverbial construction licenses instances, e.g., (36), *They got bored in a minute*. In this example, the Aktionsart of the verb matches the type called for by the valence of the frame adverbial: the class of telic (or, equivalently, directed) events. Via the override principle, this construction also performs implicit type shifting, as in (30): *They were bored in a minute*. In this example, a stative verb receives an inchoative construal: the event denoted is the onset of boredom; this event counts as an achievement. This construal involves the addition of the inchoative operator BECOME to the Aktionsart representation of the state; it reflects the reconciliation of a unification conflict between the verbal Aktionsart and the constructional semantics (in favor of the latter).

The two adverbial constructions described in this section display distinct patterns of perfective coercion: state radicals receive exclusively episodic (or, equivalently, state-phase) readings when combined with the frequency adverbial construction and inchoative (or, equivalently, achievement) readings when combined with the frame adverbial construction. This pattern follows from the event types denoted by the two respective constructions. State verbs receive inchoative readings in the frame adverbial construction because the construction denotes a (caused or effected) change of state. The resultant-state inference is crucial to semantic reconciliation, since extensible situations are uncontainable. However, the terminus of the state is irrelevant. State verbs receive episodic readings when unified with the frequency adverbial construction because this construction denotes a more general situation type, the event type. The resultant-state inference makes no specific contribution to semantic reconciliation, which relies instead upon the absence of downward entailment with respect to the reference interval.

5.2. *Aspectual shift constructions*

The two shift constructions under discussion here, the English progressive and perfect constructions, specify not only valency, as in the case of the aspectually sensitive adverbial constructions discussed in 5.1, but also constituency, since they specify a sisterhood relationship between a head verb and a verb-phrase sister. The aspectual mappings performed by these constructions are directly reflected in their formal structures: the auxiliary head (*be* or *have*) denotes a state and the participial complement denotes the situation radical from which that state is derived. However, a precise
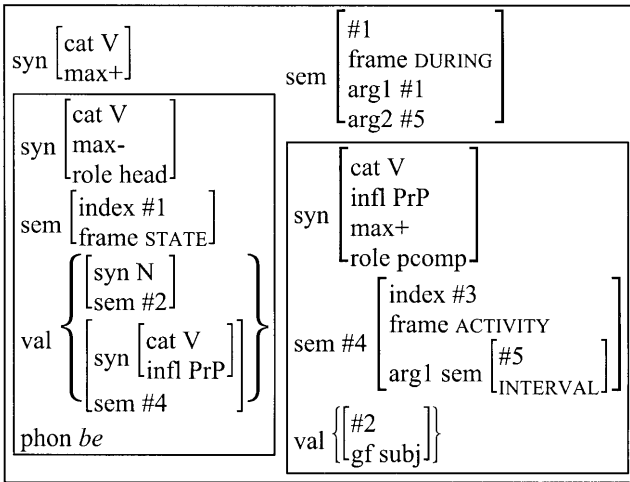
$$
\begin{bmatrix}
\text{syn} \begin{bmatrix} \text{cat V} \\ \text{max+} \end{bmatrix} & \text{sem} \begin{bmatrix} \text{\#1} \\ \text{frame DURING} \\ \text{arg1 \#1} \\ \text{arg2 \#5} \end{bmatrix} \\[2em]
\begin{bmatrix}
\text{syn} \begin{bmatrix} \text{cat V} \\ \text{max-} \\ \text{role head} \end{bmatrix} \\
\text{sem} \begin{bmatrix} \text{index \#1} \\ \text{frame STATE} \end{bmatrix} \\
\text{val} \left\{ \begin{bmatrix} \text{syn N} \\ \text{sem \#2} \end{bmatrix} \begin{bmatrix} \text{syn} \begin{bmatrix} \text{cat V} \\ \text{infl PrP} \end{bmatrix} \\ \text{sem \#4} \end{bmatrix} \right\} \\
\text{phon } be
\end{bmatrix}
&
\begin{bmatrix}
\text{syn} \begin{bmatrix} \text{cat V} \\ \text{infl PrP} \\ \text{max+} \\ \text{role pcomp} \end{bmatrix} \\
\text{sem \#4} \begin{bmatrix} \text{index \#3} \\ \text{frame ACTIVITY} \\ \text{arg1 sem} \begin{bmatrix} \text{\#5} \\ \text{INTERVAL} \end{bmatrix} \end{bmatrix} \\
\text{val} \left\{ \begin{bmatrix} \text{\#2} \\ \text{gf subj} \end{bmatrix} \right\}
\end{bmatrix}
\end{bmatrix}
$$

Figure 6. *The Progressive construction (shift). Examples:*
Explicit type-shifting: We were playing cards.
Implicit type-shifting (stative input): We were living in Boulder.
Implicit type-shifting (telic input): They were baking a cake.

aspectual characterization of the type denoted by the complement has proven elusive in each case. Each construction appears to be less selective with regard to its input type than its type-shifting function would lead one to predict. I will argue that this apparent lack of selectivity in fact reflects restrictive input conditions coupled with broad coercive capacity.

5.2.1. *The progressive construction.* The progressive construction is shown in Figure 6. It is an instance of the coinstantiation construction, as described by Kay and Fillmore (1999: 22–23). The coinstantiation construction captures both raising and control phenomena by requiring unification of the *intrinsic* (nonrelational) semantic values of an argument of the head verb and that valence member of the VP complement whose grammatical function is subject. In Figure 6, the unification formula captures the "raising" property of the auxiliary head *be*. The progressive as depicted in Figure 6 is a shift construction: its VP complement denotes an event of the ACTIVITY Aktionsart type and the construction denotes a state which holds during the interval for which the activity goes on (this period is represented as an argument of the ACTIVITY frame, where it carries the referential index #5).[7] The explicit type shift performed by the progressive involves the selection operation: the state which the progres-

sive denotes represents an intermediate rest in the temporal representation of the input activity.

The progressive construction can unify with any tense construction. A sentence which is licensed by the combination of the progressive construction and a tense construction (e.g., the past) has an interpretation which is identical to that of a simplex state predication of the same tense. As per Partee (1984), we assume that states include the reference time for which they are asserted. This inclusion relation, which is probed by the *when*-test discussed in section 1, accounts for the ability of a state to temporally overlap prior and subsequent events in a temporal discourse. Events, by contrast, are included within the reference times for which they are asserted, accounting for our intuition that events succeed one another in a temporal discourse.

The progressive, as a stativizing device, triggers coercion when combined with a stative complement VP, as per the override principle (22). The concord feature which is relevant to the application of the override principle is the feature ACTIVITY, which, as required, is invoked by both daughters in the construction. This feature expresses the semantic type of the VP complement and, via the unification index #4, the semantic value of the second valence member of the auxiliary head *be*. The activity feature "wins out" over the stative feature of the input lexical item. By analyzing the VP complement of the progressive construction as denoting an activity, we capture the intuition that progressive-form state predications like (31) *I'm living on Pearl Street*, as well as those in (42) to (44), express "temporary states":

(42)   I'm liking your explanation.
(43)   He is remaining stable.
(44)   Right now she's believing there's going to be a reconciliation.

The "temporary states" expressed by (31) and (42) to (44) are not in fact states but homogeneous activities. To see this, recall the basis upon which we analyzed certain apparently stative verbs, e.g., *sleep, hold one's breath*, as denoting activities: such verbs exhibit perfective behaviors. For example, present predications containing these verbs cannot be used to report upon events ongoing at speech time. This is shown by examples (45) to (48), where the # indicates infelicity on a reportive reading, rather than, e.g., a habitual one:

(45)   She's the one in the corner. #She wears a Fendi blazer.
(46)   Try to be quite! #The baby sleeps!
(47)   #He holds his breath.
(48)   #Your socks lie on the floor.

Activities, like accomplishments, are enabled to continue by the energy input of an animate entity. The subject denotata of such predications are participants in a causal chain, whether they are agents, effectors, or objects which an agent has oriented or configured in a specific way (e.g., socks which are in a bundle are *located* on the floor but not *lying* on the floor). The complement VPs in progressive sentences like *We were living in Boulder* denote internally homogeneous activities analogous to those which require the progressive form in (45) to (48).[8] The effector argument assigned by the operator HOLD in the causal representation of the homogeneous-activity type represents the agentive properties which accrue to the subject denotata in (45) to (48).

Crucially, a bounded state is not ipso facto a homogeneous activity; it is merely a state phase. By assuming that state phases and homogeneous activities are distinct situation types, we can explain why certain progressive-form stative predications, exemplified in (49) to (51), are anomalous:

(49)   *His hair is being green this semester.
(50)   *The British Museum is containing the Elgin Marbles right now.
(51)   *She is having a cold today.

While all of the state radicals expressed by (49) to (51) can be described as temporary, no one of them is readily construed as a homogeneous activity. Such a construal would require that the subject denotata in these sentences be seen as effectors. If these sentences have interpretations at all, they require very unusual background assumptions, e.g., that the British Museum is preventing the Elgin Marbles from leaving. Therefore, it is reasonable to conclude that participial complements in progressive constructs do not denote states, temporary or otherwise, whether or not their head verbs are stative. Progressive predications denote states, whatever the Aktionsart of the complement denotatum. Thus, an apparent paradox—a stativizing construction accepts stative input verbs—dissolves when we recognize that the input state (by the very fact of its combination with the progressive construction) comes to denote that type which warrants the use of the progressive construction. The reconciliation procedure which yields the dynamic interpretations of progressive-form state predications like those in (42) to (44) involves the addition operator: the operator HOLD and the effector argument it projects are added to the causal representation of the input state, yielding an activity representation. This type matches the type of the participial complement in the progressive construction.

By treating the complement of the progressive as denoting an activity rather than a telic event, we solve a problem of semantic representation

which otherwise requires recourse to stipulation. It is generally assumed that the semantics of the progressive is intensional (see, e.g., Dowty 1977): while the progressive combines with both telic predicates and process predicates, in the former case the culmination of the event denoted by the predicate is only a potential. For example, a progressive sentence containing a verb of creation, e.g., *She was knitting a vest*, entails nothing about the knitting event having reached its logical endpoint or about the existence of the vest. As De Swart describes this situation, "[t]he Progressive picks out a stage of [a] process/event which, if it does not continue in the real world, has a reasonable chance of continuing in some other possible world" (1998: 355). This view presents a paradox, since we cannot obviously provide a semantic representation for a stage of an event while preventing the variable which represents this event from being existentially bound. It is as though we had to represent the semantics of a partitive NP, e.g., *an engine from an old Volvo*, while ensuring that the entity corresponding to the term *an old Volvo* is not part of the discourse model. This would make little sense; we cannot extract a portion from a type whose existence is not presupposed. A possible solution to this problem is to propose that the event exists in the discourse model but that it is "stripped" of its culmination point (De Swart 1998: 355). It is not clear what this proposal would gain us, since the very existence of a telic event entails its culmination. De Swart's particular approach to the intensionality problem is to ensure through embedding that the event variable upon which the progressive operates is not added to the discourse model (1998: 354–355). This solution does not seem to generalize, however, because event variables representing activities (e.g., *She was talking with her friends*) are clearly existentially bound. How will the rule which constructs a discourse representation from a progressive sentence know the difference between an event which should "pop up" to main box of the representation and that which must not? The solution adopted here—to assume that the "input" event type is inherently processual (i.e., an activity)—avoids such problems.[9]

Under the present proposal, a progressive sentence like *She is drawing a circle* denotes a state which is a subpart not of the accomplishment type *She- draw a circle* but of the activity type which is entailed by the semantic representation of the accomplishment type. Since this activity can be identified with the preparatory activity that circle drawing entails, circle drawing can be distinguished from square drawing, etc., within the narrow window afforded by a progressive assertion. The only event variable which is added to the discourse model by a progressive assertion is the activity denoted by the VP complement of the progressive construction. Because of the subinterval property, any reasonably sized portion of this

activity is sufficient to verify the occurrence of that event. The ontological nature of the situation type added to the model, and thus the nature of the commitment made by a speaker who employs a progressive assertion, is expressed by the semantics of the progressive construction: this construction denotes a state which holds during the time that a particular activity goes on. If I make an assertion that preparatory activity (e.g., circle drawing) was going on at some point, I say nothing about whether or not that preparatory activity led to its logical culmination (a completed circle).

But of course the representation of the progressive construction given in Figure 6 predicts that we will induce a unification violation when we attempt to combine a telic verb or VP like *draw- a circle* with the construction, since the construction requires a complement denoting an activity. Only a complement with a processual denotatum, like *play-cards* or *dance-*, unifies unproblematically with the progressive construction as represented in Figure 6. This poses a problem, since clearly telic VP complements *are* welcomed by the progressive, as in, e.g., *They were baking a fruitcake*. The solution to this problem depends upon the override principle. I postulate that progressive sentences containing telic VP complements are instances of coercion. In interpreting the sentence *They were baking a fruitcake*, the interpreter must derive an interpretation of the VP complement which is compatible with the activity feature that the construction imposes on its complement daughter. Since accomplishment predicates like *bake- a cake* entail processes, the compromise interpretation will be one in which the VP complement *baking a fruitcake* denotes the preparatory process which leads to the existence of a fruitcake. As we observed above, this preparatory process can be verified under the same circumstances that lead to verification of the state which the progressive sentence denotes. The Aktionsart-based permutation involved here, in which an accomplishment radical receives an activity construal, involves selection: an activity is selected from the causal representation of the input accomplishment radical. This type shift has a precedent in coercions triggered by the presence of durational adjuncts, e.g., *for ten minutes*. For example, the accomplishment predicate *walk home* receives an activity construal in (52):

(52)   She walked home for ten minutes and then decided to take the bus.

As in the case of the progressive sentence *They were baking a fruitcake*, the activity denoted is entailed by the causal representation of the event radical.

What of the combination of the progressive and an achievement radical, as in *She was winning the race*? This combination again yields a co-

erced processual interpretation of the VP complement. Our intuitions suggest that a progressive-form achievement predication denotes a preparatory phase which is not entailed by the corresponding simple past predication (*She won the race*). Dowty (1986) describes achievement verbs as

those kinesis predicates which are not only typically of shorter duration than accomplishments, [but also are not ordinarily understood] as entailing a sequence of subevents, given our usual everyday criteria for identifying the events named by the predicate. (1986: 43)

Our intuition that sentences like *She was winning the race* stretch out the temporal profile of an achievement to reveal its subevents makes sense only if we recognize such sentences as instances of coercion. Since the progressive requires that its lexical complement denote an activity, the interpreter of a progressive-form achievement predication is induced to "find" an activity phase within an event which would otherwise represent a momentaneous transition. An achievement predication which entails the occurrence of a preparatory activity is for all intents and purposes an accomplishment; the sentences *She was winning the race* and *She was fixing the fence* are identical so far as the contribution of the progressive is concerned. This equivalence is represented in our system by means of an indirect type shift: an activity predicate is added to the causal representation of the input achievement radical; this predicate then becomes available for selection, resulting in an activity representation.

The analysis of progressive-form achievements offered here is a departure from standard accounts, since progressive-form achievement predications are generally said to require iterated readings, as in *She was blinking* (Herweg 1991; Langacker 1991; Bickel 1997). However, such iterated readings are generally required only insofar as the noniterated reading requires unusual background assumptions—for example that a single blink can be "tracked" during the time that it occurs. Further, the interpretive potential represented by the iterated reading is not unique to progressive sentences containing VP complements of the achievement class. Perfective verbs of all Aktionsart classes allow iterated readings in progressive sentences. For example, the progressive-form accomplishment sentence *She was fixing the fence* and the progressive-form activity sentence *She was running* both have habitual readings, which are particularly robust in conjunction with frame adverbials like *that summer*.

On the assumption that habitual events have the same temporal and causal representations as event chains, habitual progressive predications have a straightforward analysis. Since the progressive construction selects

for the activity type as its complement, and a habitual event radical, e.g., *They pick- up donations on Tuesdays*, constitutes an activity, predicate-argument structures denoting habitual events unify directly with the progressive construction. Combination of the progressive with a tense construction, e.g., the present, will yield constructs like *They are picking up donations on Tuesdays*. Notice that adverbial expressions which denote event repetition, e.g., *on Tuesdays*, or large intervals, e.g., *last summer*, can impose iterated-event readings upon situation radicals which might otherwise qualify as simplex events. However, as argued above, the progressive itself is not responsible for any such implications of iteration, since those implications are present whether or not the progressive is used, as in, e.g., *They picked up donations on Tuesdays*. The progressive construction simply requires a VP complement denoting an activity, and iterated events qualify as such.

5.2.2. *The perfect.* Like the progressive, the perfect construction is a stativizer, and, like the progressive, it appears to apply vacuously when combined with stative complement VPs. The perfect construction is represented in Figure 7. The perfect, however, presents certain analytic complexities which go beyond its role as a stativizing device. The first such complexity is the apparently noncompositional interaction of tense
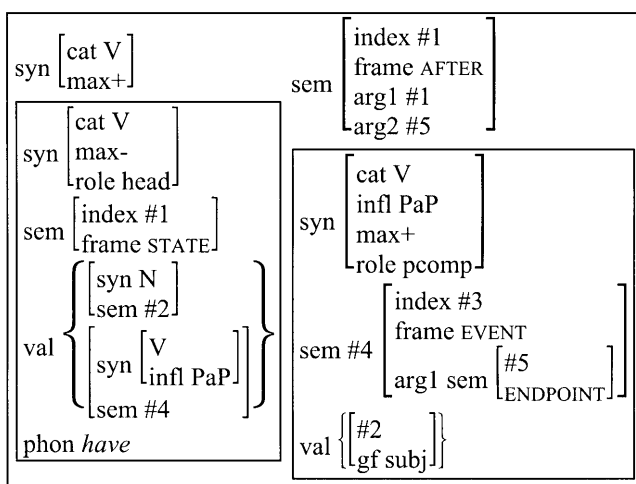
Figure 7. *The perfect construction (shift). Examples:*
Explicit conversion: The Eagle has landed.
Implicit type-shifting (existential semantics): I've been rich and I've been poor.
Implicit type-shifting (continuative semantics): I've had a nice day.

(as expressed by the auxiliary) and anterior aspect (as expressed by the past-participial VP) in the case of the "resultative" present perfect, as reflected in constraints involving adverbial time-specification, temporal discourse, and focus-presupposition constructions (see Comrie 1976; Klein 1992; Michaelis 1998: chapter 5). For example, present perfect predications, unlike simple past predications, are incompatible with adverbial specification of event time, as in *He has been born in 1941*, although nothing in the semantics would seem to bar this. The perfect is often distinguished from the past on the grounds that it is a relative rather than absolute tense. However, while it makes sense to refer to the past perfect as a "past in past", it makes little sense to refer to the present perfect as a "past in present", since this is exactly what the past tense is. Since the present perfect, on its resultative reading, cannot be distinguished from the simple past on truth-functional grounds, the divergence in syntactic behavior calls for a discourse-pragmatic explanation (Heny 1982: 154). One such explanation involves a markedness opposition between the present perfect and simple past. For example, Michaelis (1998: chapter 5) proposes that the present perfect requires existential rather than anaphoric binding of the relevant event variable, while the past allows either form of binding.

The second analytic problem presented by the perfect involves the appropriate characterization of the "current relevance" implication commonly associated with the perfect-form predications. Although some authors, including De Swart (1998: 354), identify this implication with a resultant-state entailment, two widely recognized usages of the perfect, the existential and continuative uses, lack this entailment. These two usages, along with the resultative usage, are exemplified for the present perfect in (53) to (55). For each usage, an example sentence is given in (a), a prose description of the usage is given in (b), and a semi-formal semantic representation, based upon McCawley (1971, 1981), is given in (c):

(53) Resultative:
    a. The persons responsible have been terminated.
    b. "A result of a unique past event obtains now."
    c. $\exists!e$: Event (e) $\exists!t$: $t<now$ [Endpoint (e,t) & 'e's result state holds now']

(54) Existential:
    a. We've had this argument before.
    b. "One or more events of a given type culminated within a time span whose upper boundary is the present."
    c. $\exists e$: Event (e) $\exists t$: $t<now$ [Endpoint (e,t) & 'e is repeatable at present']

(55) Continuative:
    a.   I've been ill for a week.
    b.   ''A state obtained throughout an interval whose upper boundary is the present.''
    c.   ∃!e: State-phase (e) ∃!t [Endpoint (e,t) & 't immediately precedes the present']

In (53c), (54c), and (55c), the traditionally recognized common denominator of ''current relevance'' is seen as a semantico-pragmatic variable whose values are distinct conventional implicata involving the present. These implicata are represented by the conjuncts in single quotation marks. In accordance with McCawley (1971), I assume that the perfect construction is ambiguous with respect to these meanings. As McCawley shows, perfect predications can yield crossed readings in coordinate structures—a standard test for ambiguity (Zwicky and Sadock 1975). For example, (56) could not be used to refer to a situation in which Moe is currently out of work as a result of having been fired (resultative reading) while Harry is currently employed despite firings in the past (existential reading).

(56)   Moe has been fired and so has Harry.

Garden-path effects provide further support for the ambiguity analysis of the perfect, as in (57), a line attributed to Groucho Marx:

(57)   I've had a wonderful evening, but this wasn't it.

This remark is humorous because the contextually appropriate (continuative) reading must ultimately be rejected in favor of a far more remote (existential) reading. The fact that perfect predications exhibit both crossed readings and garden-path effects strongly suggests (pace Brinton 1988 and Klein 1992) that the distinct perfect readings described in (53) to (55) are not merely inferences from context, e.g., particular combinations of adverbial meaning and Aktionsart. While adverbs like *before* and *twice* are hallmarks of existential meaning, the presence of a frame or frequency adverb is not a necessary condition upon the existential interpretation, since, for example, the existential predication in (55) does not contain an adverbial expression:

(58)   I've met the Governor.

By the same token, the presence of a stative complement is not sufficient to induce the continuative reading: sentence (59) contains a state radical and yet has a resultative reading (e.g., the speaker now has immunity to German measles), a continuative reading (the illness lasted at least until

now) and an existential reading (e.g., the speaker is listing events which qualify as tokens of the "illness episode" type):

(59)   I've had the German measles

The distinct readings described in (53) to (55) can be represented in the present framework without recourse to conventional implicature. I propose instead three perfect operators, PERF-R, PERF-E, and PERF-C, each of which is subject to two types of conditions: mapping conditions, described in the (a) clauses of (60) to (62), and rest-identity conditions, described in the (b) clauses of (60) to (62):

(60)   PERF-R:
    a.   Mapping: Telic event → state
    b.   Posterior rest: resultant state

(61)   PERF-E:
    a.   Mapping: Event → state
    b.   Posterior rest: medial state

(62)   PERF-C:
    a.   Episode → state
    b.   Posterior rest: initial transition is final transition of episode

As shown in (60a), the resultative perfect (PERF-R) requires a telic input type. The Aktionsart-based operation which underlies this mapping is selection. As stipulated by the rest-identity condition in (60b), selection targets a resultant state in the causal representation of the input type, an accomplishment or achievement radical. By identifying the state of aftermath with the resultant state of the input type we account for Klein's (1992: 539) observation that the events expressed by resultative-perfect sentences tend to be recent events. De Swart (1998: 354) captures this interpretive constraint by stipulating that "the result state starts right at the end of the event". This stipulation appears unnecessary here, because the resultant state is necessarily contiguous to the inchoative event in causal representation. In addition, condition (60b) captures the "unique event" condition represented in (53c) by means of the existential quantifier ∃!. If the output state is entailed by the causal representation of the input event, there can be only one causal event, since selection is defined over a single Aktionsart representation. Further, we account for the fact that atelic events can have resultant-state implications in perfect predications, as shown in (63):

(63)   I've knocked (so someone should be coming soon).

Sentence (63) has a coerced interpretation. The Aktionsart-based opera-
tion underlying this type shift is addition: the operator CAUSE and its
arguments are superimposed upon the causal representation of the input
activity radical *I knock-*. Because the causal representations of activity
radicals do not include resultant states, adduction of the relevant resul-
tant state will depend upon cultural scripts of various kinds, e.g., models
of hailing conventions, as in (63).

As shown in (61a), the existential perfect (PERF-E) maps an event (or,
equivalently, a dynamic situation) onto a state. The Aktionsart-based
operation which executes this mapping is selection of a posterior rest. The
rest-identity condition in (61b) captures the interpretive constraint ex-
pressed as a conventional implicature in (54c): "*e* is repeatable at pres-
ent". McCawley (1981: 82) describes this constraint as follows: "The
speaker and addressee's shared knowledge does not rule out the con-
tinued occurrence of events of the kind in question". Evidence for this
constraint is provided by appropriateness judgements. For example, (64)
is appropriate only if the sale is still ongoing and the addressee is pre-
sumed to be capable of attending it prior to closing day:

(64)   Have you gotten to the Nordstrom sale?

A posterior rest qualifies as a medial rest if it holds during the interval
which separates two type-identical events. Since this rest holds at speech
time, the second of these two events is projected rather than reported.
That is, the input event must be one capable of concatenation. Thus, the
state which follows a given visit to Nordstrom is never excluded from
preceding another event of this same type. Because replication occurs in a
possible world, even a unique event is construable as belonging to an
event chain, as in (65):

(65)   I've visited him once.

Because the rest following the visiting event also precedes any future
event of the same type, (65) entails a minimal chain, consisting of two
tokens of a given event type. Interpreters have considerable latitude in
inferring the appropriate event-type predicate, and therefore events which
appear unique can typically be construed as repeatable ones. Consider,
for example, (66), which is a priori anomalous on an existential reading,
since Janis's death cannot be replicated (small caps indicate points of
prosodic prominence):

(66)   Since WOODSTOCK, Janis has DIED.

However, (66) does have an existential reading if construed as evoking
a propositional function of the form *x die-*, where the range of the vari-

able might be restricted to rock artists who appeared at Woodstock, as in (67):

(67)   Since WOODSTOCK, JANIS has died, HENDRIX has died, Keith MOON has died, Paul BUTTERFIELD has died, and JERRY has died.

Example (67) demonstrates that a unique event can also qualify as a concatenated event via extrapolation of the appropriate open proposition.

As shown in (62), PERF-C maps an episode to a state. This analysis represents a departure from that given in (55b), in which continuative perfect sentences assert the existence of a state phase. The input type in (62) is a class which properly includes the class of state phases, as well as that of activities. However, we will preserve the present-contiguity condition described in (55c): the output state is a posterior rest whose time of inception is identical to the final transition of the episode. This condition is designed to capture the difference between continuative and existential readings of perfect sentences containing stative complements, as in (59), repeated here as (68):

(68)   I've had the German measles.

The continuative reading is that in which the illness has continued up to speech time; the existential reading simply requires one or more episodes of German measles in the past. Except for the ''present contiguity'' condition, the continuative and existential readings would not differ, since both entail a coerced state-phase reading of the state radical *I have- the German measles*. As a consequence of the persistence entailment, the continuative perfect selects for extensible situation types, including homogeneous and heterogeneous activities, as in (69):

(69)   a.   Public opinion has *fluctuated* all month.
       b.   City and county officials have *discussed* the issue for over a year.
       c.   I've *watched* you for a long time.
       d.   We've *waited* for this news a long time.

While native speakers whom I polled judged all of the sentences in (69) to be acceptable, they often suggested paraphrases containing progressive-form complements, e.g., *I've been watching you*. The more dynamic the activity radical, the less acceptable the corresponding continuative perfect predication appears to be: continuative perfect predications containing agentive heterogeneous-activity radicals, e.g., *The kids have played in the pool all day*, were most likely to be seen as requiring perfect-progressive paraphrases. Such evidence suggests that the category of state phases has a privileged status with regard to the continuative perfect.

Despite their prototypical nature, state-phase perfects have paradoxical properties. Because state predications license the subinterval entailment, the interpreter can never be assured that a state, like that of being ill in (55a), is wholly contained within the interval for which it is asserted to hold. For this reason, one might argue, a continuative perfect sentence need not denote a state which follows a final transition. This argument fails to distinguish between cessation of the denoted state phase and cessation of the state from which that phase is drawn. In certain contexts, these two types of cessation coalesce, as in the following excerpt from the comic strip *Cathy*:

(70)   My nails *have been decent*. Today I bit them off. My skin *has been fine*. Today it broke out. My demeanor *has been poised and professional*. Today I spilled coffee on my hair, ripped my pantyhose, broke my purse strap, and sat on the floor of a 7-Eleven in my power suit and ate a bag of Cheetos (*Cathy*, 24 November 1992)

In other contexts, the two forms of cessation diverge. For example, (71) does not entail that reptiles are now extinct:

(71)   Reptiles have existed since the Paleozoic era.

However, the perfective character of state-phase predications prevents us from concluding that (71) denotes a state which overlaps speech time: it is the posterior rest, and not the contiguous state phase, which actually holds at speech time.

5.3.   *Tense constructions*

5.3.1.   *The past in French and English*

5.3.1.1.   *The French imperfective.*   The two English shift constructions discussed in section 5.2 are traditionally viewed as instances of grammatical aspect, but it is difficult to justify this categorization typologically. While progressive sentences denote states, the English progressive is not directly analogous to imperfective aspect, as found, e.g., in French. The progressive is neutral with regard to tense, and combines freely with the tenses, while imperfective morphology in Romance languages inherently expresses the past-tense relation. However, as Smith (1997), De Swart (1998), and Michaelis (1998) have observed, the two constructions overlap in some contexts. One overlap context is shown in (72). Here, a French imperfective sentence is translated by an English progressive sentence:

(72)   C'est quand je suis passé devant le magasin! Il y avait un type qui *faisait* une démonstration pour aguicher la clientèle.

'It's when I went past the store. A guy was *doing* a demonstration to rope in customers.' (Binet, *Les Bidochon* 8, p. 14)

In (72), the demonstration is presented as an event that had begun prior to the point at which the narrator passed the store. As in the progressive-form translation, the *Imparfait*-form sentence in (72) tells us nothing about whether the demonstration was completed following the time frame established by the perfective predication preceding it. Events reported in the imperfective, like those reported in the progressive, include reference time, and thus it is appropriate to conclude that both imperfective and progressive predications denote states. However, the English progressive construction and the French imperfective construction do not have identical functions. This is shown by (73):

(73) Tiens, ils *avaient* des lacets, les préhistoriques?

'Huh! They had shoelaces, prehistoric people?' (Binet, *Les Bidochon* 2, p. 30)

If (73) were translated by a progressive sentence, the result would be an anomalous English sentence: *They were having shoelaces*. The pattern in (72) and (73) is explained when we assume that the English progressive is a shift construction, while the French imperfective is a concord construction. The French imperfective construction is represented in Figure 8.
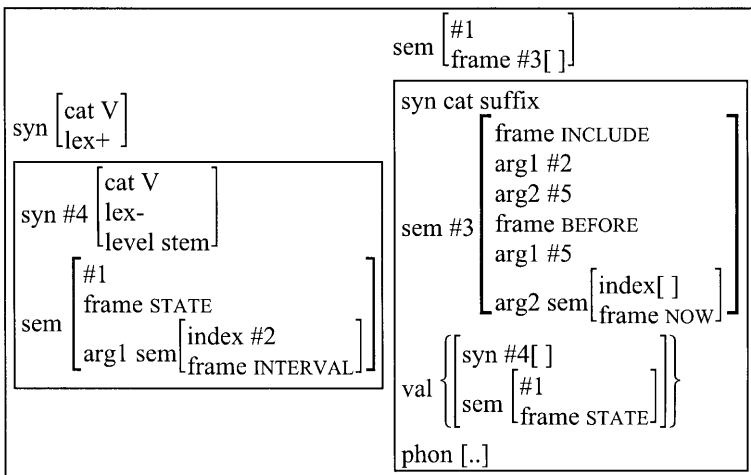
Figure 8.   *The imperfective construction (concord). Examples:*
       Instantiation: Ils avaient des lacets.
       Implicit type-shifting: Il y avait un type qui faisait une démonstration.

Since the imperfective construction signifies a past-tense relation, the *sem* value of the suffix includes the frame BEFORE. This frame has two arguments, a *reference time* (indexed by the unification variable #5) and the (deictically indexed) time of speaking. The verbal head of the construction denotes a state, as indicated by its frame value. The STATE frame has one argument, an interval, since states are represented as properties of times (Herweg 1991). As a past tense, the imperfective construction relates the state type to a past reference time. The INCLUDE frame in the semantics of the suffix and the construction requires that the reference time be included within that state. (The person-number features and phonological form of the suffix have been omitted for ease of exposition.) The INCLUDE frame represents an inference pattern licensed by past-tense state predications: the past interval at which the state is asserted to obtain does not exhaust the tenure of that state. This analysis captures the idea that a speaker who asserts, upon arriving at a destination, *My cabby was Latvian* is only "sampling" a relevant portion of a permanent state (see Partee 1984; Herweg 1991; Klein 1992; inter alia). The concord restriction upon the imperfective is represented in Figure 8: the verbal head is a state and its complement (the imperfective suffix) contains a valence requirement calling for a state. That is, the imperfective construction can and typically does simply flag the inherent stativity of the lexical head. However, since all concord constructions trigger implicit type-shifting via the override principle (20), the imperfective can also be used for aspectual type-shifts, as in (72). French and English both imperfectivize, but the mechanism is a different construction in each language.

In the analysis represented in Figure 8, imperfective sentences always represent state sentences. This analysis diverges from that of De Swart (1998), who assumes that imperfective predications denote not only states but also homogeneous events, i.e., activities. While the imperfective construction can combine with activity predications, I maintain that such combinations are instances of coercion. If we were to assume that the imperfective construction denoted an atelic situation type, and not merely a state, we would be forced to explain why, for example, (73) does not have the potential for a coerced activity reading. The only type shifts which are in fact performed by the imperfective are those in which events, including activities, are construed as states, as in (74). In the context preceding (74), the character Raymonde has inadvertently interrupted her husband Robert and his friend during a pit stop in the woods:

(74) Robert: Raymonde, enfin!
Raymonde: Je—Je *cherchais* un coin tranquille. Excuse-moi!

'Robert: Raymonde, really!
Raymonde: I—I was looking for a private spot. 'Excuse me!'
(Binet, *Les Bidochon* 6, p. 28)

In (74), the activity verb *chercher* ('look for') is combined with the imperfective construction, the result being a coerced stative construal in which the seeking activity is understood to have been going on prior to the point at which it was interrupted. The stative construal involves selection of an intermediate rest in the temporal representation of the input activity. Under this construal, the situation denoted includes the past reference time (the time at which the interruption occurred). As in (72), the construal is analogous to a progressive construal in English. Habitual and iterated events are subject to the same analysis. As argued above, they count as heterogeneous activities. As such, they are subject to stative coercion analogous to that exemplified in (72) and (74). The examples in (75) and (76) illustrate the interaction of the imperfective construction with situation radicals denoting iterated events:

(75) Raymonde: Qu'est-ce qu'ils te voulaient, ces deux messieurs?
Robert: On *s'échangeait* nos adresses!

'Raymonde: What did they want, those two gentlemen?
'Robert: We were exchanging addresses.' (Binet, *Les Bidochon* 2, p. 50)

(76) T'as pas remarqué les gestes que je te *faisais* pour te le dire discrètement?

'Didn't you notice the gestures I was making to you to try to let you know discretely?' (Binet, *Les Bidochon* 8, p. 35)

In (75), the iterated event is the exchange of addresses among three people, an event which Raymonde observed only momentarily. By using the imperfective form of *échanger* 'exchange', Robert takes the perspective of his addressee: he presents the situation as one which includes the time at which it was witnessed, thus leaving open whether or not the exchange was completed (in fact it was not). This construal is of course the same one associated with the imperfective predication (72), which similarly involves selection of an intermediate rest between type-identical events in the input temporal representation. In (76), the iterated event is the performance of a series of gestures. The use of an imperfective predicate to describe this event again signals inclusion of reference time: the interval containing the series of gestures properly includes the time of a (potential) perception event, here expressed by a perfective form of the verb *remarquer* 'notice'. Either of the iterated events in (75) and (76) could have been

described by means of a perfective predication. For example, if the context of (75) were altered so that Raymonde's inquiry concerned what Robert had just done, Robert's response could have taken the form of a perfective (*passé composé*) predication: *On s'est échangé nos adresses*. The construals entailed by the perfective versions are no less likely to involve iteration of subevents; the use of the perfective merely entails that the endpoints of the iterated event are included within the past reference time, rather than including that time.

I propose that coercion yields gnomic and habitual readings of event radicals in French under the same formal conditions which give rise to the partitive readings of event radicals in (75) and (76). As discussed in section 2.3.2, although episodic sentences and gnomic/habitual sentences have distinct epistemic implications, the episodic–generic distinction is not an aspectual one: iterated-event sentences count as such whether they are actual or structural. If an event radical which is not an event chain is combined with the imperfective construction, the coerced stative reading is necessarily a partitive one, in which a phase within the Aktionsart representation is selected. If, by contrast, an iterated-event radical is combined with the imperfective construction, the coerced stative interpretation involves the selection of an intermediate rest in the temporal representation of that event chain. The selection operation then yields the coerced stative interpretations in (77) and (78):

(77) Quand je pense que tout le quartier te *surnommait* ''le père tranquille'' parceque tu *passais* tes journées à cultiver des géraniums.

 'When I think that the whole neighborhood used to call you "Gentle Pops" because you spent your days cultivating geraniums!' (Binet, *Les Bidochon* 5, p. 38)

(78) Ma femme m'a quitté parceque je *buvais* et Maman a dit que ça me *donnait* mauvaise haleine.

 'My wife left me because I drank and Mother told me it was giving me bad breath.' (Binet, *Les Bidochon* 10, p. 43)

The clauses containing the italicized verbs in (77) and (78) count as habitual predications, but there is nothing about temporally stable iterated events which requires imperfective aspect; as we saw in (79), such events can be reported by means of the perfective construction, if construed as contained within a past interval:

(79) Mais pendant quinze ans j'ai cru que j'étais un superman, moi! J'en *ai parlé* autour de moi, je m'en *suis vanté* auprès des copains au boulot! Je vais avoir l'air de quoi, à présent?

'But for fifteen years I thought I was a superman! I talked about it to everyone around. I bragged about it to friends at work! What am I going to seem like now?' (Binet, *Les Bidochon* 13, p. 17).

The character Robert utters (79) after having received a devastating review of his marital performance over the years. This sentence strongly implies that the series of boasting events is delimited by a past interval. However, it would make little sense to explain the use of perfective predications in (79) by saying, as Langacker (1996), that these predications denote iterated events rather than generic ones. Instead, what (79) shows is that habitual predications need not be state predications. Bickford and Marlett (1988) make this same point in a study of mood and aspect in three Mixtec languages: "the mere habituality of a situation is not sufficient to place a verb in the Imperfective" (1988: 7). After observing that habitual predications in Mixtec can be reported in both the perfective and imperfective aspects, they conclude that "what makes most habitual situations Imperfective is not habituality per se, but the coincidence of some other time span (such as the moment of speech) with the habitual macro-situation, imposing an inside-out perspective on it" (1988: 8). In other words, it is inclusion of reference time, rather than merely being a characteristic situation, which causes a gnomic or habitual situation to be coded as imperfective.

5.3.1.2.   *The past in English.*   The foregoing discussion has implied that aspectually sensitive tenses should be postulated only when differences in the aspectual requirements of a given tense category are expressed morphologically. I propose, however, that situation-reporting tenses are by nature aspectually sensitive. In particular, I will suggest that the English past, as well as the French and English present tenses, are concord constructions which contain aspectual unification requirements and accordingly trigger coercion effects. As a consequence, our treatment of the English past construction will be isomorphic to that of the French perfective and imperfective constructions. This extension is justified, since it seems inappropriate to assume that direction of inclusion distinguishes past tenses of events from past tenses of states just in case this difference is morphologically expressed (as it is in French). Why should we not also assume two past constructions for English, which happen to be homophones? One argument against this approach is to say, as most do, that the English past does not take issue with the inclusion relationship, which is instead determined by the aspectual classes of the verbs themselves. On this view, essentially adopted from Reichenbach (1947), the past specifies only that reference time is prior to speech time (and possibly also that

reference time is an anaphorically linked interval). The problem with this view, as I see it, is not only that it makes aspectual sensitivity something which English tenses inexplicably lack, but also that it requires one to presume that verbal semantics contains a constraint related to reference time—a discourse-pragmatic concept that plays no direct role in Aktionsart representation (see Klein 1992 for argumentation to this effect). My solution, then, is to propose that English has two phonologically identical past-tense constructions which are identical to the perfective and imperfective semantically, in that the INCLUDE frame in each of the two respective past constructions specifies a distinct direction of inclusion for reference time.[10]

To presume that English has aspectually sensitive tense constructions leads us to predict certain coercion effects, in accordance with the override principle. We have seen such effects in imperfective and perfective constructs in French, and we thereby predict their existence in the case of English past predications. We will also predict that certain past-tense sentences in English will be ambiguous between coercion and concord-based readings, because the same form will denote two different situation types, state and event. These predictions are borne out. In examples (80) to (84) we see paired past sentences, in which each pair represents one of the five respective Aktionsart classes: state, activity, achievement, accomplishment, and state phase. The members of each pair are formally identical, but the distinct contexts supplied cause their readings to diverge:

(80) a. She *remembered* where the money was hidden [but no one else did].
     b. She *remembered* where the money was hidden [but only after some incentives were offered].

(81) a. [I glanced back at her but she didn't notice.] She *looked* elated.
     b. [I told her the answer.] She *looked* elated. [Then frowned in consternation.]

(82) a. [Sue decided to look dramatic that day.] She *wore* a pink Chanel suit and an Hermès scarf.
     b. [I studied Sue's elegant outfit.] She *wore* a pink Chanel suit and an Hermès scarf.

(83) a. Thick smoke *filled* the corridor. [In a matter of minutes, we could no longer see the exit signs.]
     b. [I opened my door and looked out.] Thick smoke *filled* the corridor.

(84)   a.   They *recited* the mass in Latin.
       b.   [At the time of the Second Vatican Council,] they *recited* the mass in Latin.

In each of these examples, we will regard interpretations which diverge from predicate Aktionsart values as evidence of a mismatch between predicate and construction denotata, while straightforwardly projected predicate Aktionsart values will be regarded as evidence of semantic concord between predicate and construction. In (80a), the stative verb *remember* has a stative interpretation; that is, there is semantic concord between situation radical and construction. In (80b), *remember* has an inchoative interpretation via coercion: an inceptive event is added to the Aktionsart representation of the stative predication to resolve the semantic conflict which occurs when a stative verb is combined with the perfective version of the past construction. The examples in (81) are similar to those in (80), except that an episodic rather that inchoative interpretation appears in the perfective coercion context (81b). The coerced construal in (81b) involves addition: the operator BECOME is added to the causal representation of the input state. In (82a), the homogeneous activity verb *wear* receives an episodic interpretation that reflects its inherent perfectivity: the scope of the situation includes Sue's donning and doffing the outfit. In (82b), this same predication receives a stative interpretation, in which the situation of Sue's wearing a particular outfit includes the time at which the speaker took note of this. Since reference time is located inside the situation time, the scope of the predication is highly constrained: it does not, for example, include the time at which Sue put on her outfit. The stative interpretation in (82b) is obtained by selection: the selected state is the second argument of the operator HOLD in the causal representation of the input activity. In (83a), the achievement verb *fill* has an inchoative interpretation, in which smoke diffuses through the corridor; this interpretation involves construction-predicate concord—both predicate and construction denote achievements. In (83b), the achievement verb *fill* denotes a state (the corridor's being filled with smoke) that includes the point at which the narrator observed this state. This interpretation is obtained by selection of that state projected by the operator BECOME in the causal representation of the input achievement (or, equivalently, that state which follows the initial transition τ in temporal representation). This semantic operation resolves the semantic conflict between the situation radical, which denotes an event, and the imperfective version of the past construction, which denotes a state.

The examples in (84) are complex, since they involve the three-termed relationship between iteration, genericity, and stativity. In (84a), the ac-

complishment verb *recite* is interpreted in a manner consistent with its Aktionsart: it denotes the execution of a pattern, and the NP *the mass* is an incremental theme in the sense of Dowty (1991). In (84b), this same verb receives a stative construal: the predicate *recited the mass in Latin* denotes a homogeneous situation which includes the time of the Second Vatican Council. (We can presume, whether or not we have the relevant world knowledge, that this situation ended shortly after the conclusion of the Second Vatican Council, but this presumption is the product of pragmatic inference.) The stative construal in (84b) is a coerced reading, which results from a chained type-shift: the input accomplishment representation is shifted to an event-chain representation via concatenation. This event chain is then available for selection: a intermediate rest is selected from the temporal representation of the event chain, yielding a state representation.

In English, as opposed to French (cf. [75] and [76]), an event-chain radical which is construed as a state via coercion is necessarily construed as structural rather than actual. Pragmatic conditions appear to determine whether an iterated event is sufficiently structural to license a stative construal. Therefore, judgements of "extensibility" will have a gradient character. For example, the situation type expressed by (85) is extensible if interpreted as structural, as in (86), but only marginally so if not, as shown in (87):

(85) I went to a movie every weekend
(86) I went to a movie every weekend when I was kid and in fact I still do.
(87) ??I went to a movie every weekend over vacation and in fact I still do

Thus, the otherwise paradoxical fact that two different aspectual type shifts are performed by the same tense form is explained on the assumption that there are two distinct but homophonous past constructions in English—one which requires state concord and another which requires event concord. While this solution is less economical than traditional approaches to the meaning of the English past tense, it can be justified as offering improved data coverage. To see that this is so, let us compare it to two monosemic analyses that have been offered in the literature. In the first of these analyses, the past tense has a single specific meaning. According to Bybee, Perkins, and Pagliuca (1994: 152), the simple past in English "express[es] an explicit temporal relation, that the narrated events occurred before the moment of speech". In the second of these analyses, the English past tense has a vague meaning, which is fixed only by verbal Aktionsart. According to Smith (1997: 170–171), the English past ex-

presses the perfective viewpoint, in which the endpoints of the denoted situation are included in the reference frame. "A sentence with the perfective viewpoint presents a sentence with the endpoint properties of its situation type schema" (1997: 171). Since the Aktionsart representations of states do not include endpoints, past stative predications are "compatible with either a closed or open interpretation, depending on context" (1997: 171).

Each of these analyses fails to account for certain kinds of stative past sentences. The Bybee, Perkins, and Pagliuca analysis can account for perfective readings of state predications, whether these involve the addition of an inceptive transition, as in (80b), or inceptive and terminal transitions, as in (81b). However, this account cannot capture the inferential properties of stative past sentences, in particular their extensibility to the present. Nor does it explain the means by which past event sentences receive stative readings—as in (82b), (83b), and (84b)—if past sentences denote events they cannot also denote states. The Smith analysis can presumably account for perfective readings of state predications—as contextual inferences—and for cases of imperfective concord, since stative verbs specify no endpoints. But this analysis, like that of Bybee and colleagues, fails to explain why it is that past sentences containing event verbs of all Aktionsart classes can have stative interpretations. The facts of stative coercion, and stative concord, appear to require the homophony analysis.

Once we assume that the past construction triggers implicit type shifts, we have a motivated explanation for the protean behavior of state and activity sentences in narrative texts. Prior attempts to model these behaviors have had unwelcome consequences both for Aktionsart representation and the formulation of temporal-discourse interpretation principles. As we have seen, past stative predications can have both inchoative and episodic readings in temporal discourse. Examples of these two eventive readings are given in (80b) and (81b), respectively. For both Dowty (1986) and Bickel (1997) these readings require fundamental changes in the semantic analysis of states. Bickel proposes (1997: 124) that the Aktionsart representations of all state verbs contain inceptive phases. If the inceptive phase of a state is selected by perfective grammatical aspect an inchoative readings results. If a terminal phase is introduced into the state's Aktionsart representation, as by a durational adverb, an episodic reading results. While this model gives a straightforward picture of the interaction between grammatical aspect and Aktionsart, it has one highly undesirable effect: it makes the Aktionsart representations of states and achievements identical. For his part Dowty (1986) proposes to accommodate inchoative and episodic readings of state predications by assum-

ing, contra Partee (1984) and others, that state predications, like event predications, move reference time forward in temporal discourse. Inclusion becomes a contextual implication. For this reason, Dowty's rule for the interpretation of temporal discourse

makes no mention of differences in aspectual class, and will therefore treat statives just the same as accomplishments and achievements in locating their reference times. But ... the inferences we draw in a narrative about which events or states overlap with others in the narrative is not really a consequence of the times sentences are *asserted* to be true, but rather also in part a consequence of the times at which we *assume* that states or events actually obtain or transpire in the real world, intervals of time which may in some cases be greater than the intervals of time for which they are simply asserted. (Dowty 1986: 48)

Dowty goes on to argue that since states have the subinterval and cumulativity properties, state predications may extend "backwards" in the time line of the text to include previously invoked reference times. The problem, of course, is that a state which is included within its reference time is not a state but an event, and is coded as such in languages with a morphosyntactically expressed perfective aspect. Thus, Dowty, like Bickel, has accounted for perfectively interpreted states by neutralizing the event–state distinction. Because the event–state distinction has robust reflexes throughout the grammar, it is clear that we must find an alternative account of the relevant textual effects. The coercion-based treatment of the past-tense construction appears to provide such an account. On this model, inchoative and episodic readings of state predications result from semantic conflict resolution: the "event" feature of the perfective past-tense construction, a concord construction, overrides the "state" feature of the input verb. Because the past-tense construction has an alternate version which denotes a state type, we predict that imperfective coercions will also occur in texts, resulting in the extension of the denoted situation to times in the text prior to the current reference time. As shown by the narrative passage in (88), this prediction is fulfilled:

(88)   Kent ... stepped out, so that he hung suspended in a dark green jungle of foliage over the yawning void. ... A vampire *flapped* systematically up and down the wall .... (G. Wolfe, *Storeys from the Old Hotel*, p. 141).

In this passage, an activity verb, *flap*, receives a stative reading. We characterize this reading as stative because the time of the flapping event includes the time of Kent's jump from the top of the wall—the vampire was flapping prior to the point at which Kent stepped out. This reading would

ordinarily require use of the progressive construction, an explicit type-shifting device. However, the author has chosen an implicit stativization device—the imperfective version of the past construction. Since the stative reading in question is derived by conflict resolution, there is no need to postulate an additional stative lexical entry for the verb *flap* based upon the usage in (88). As in the constructional account of argument-structure patterns, nonce verb meanings are simply that—generated on the fly and having no effect upon lexical organization.

5.3.2.   *The present in French and English*   On the homophony-based analysis of the English past construction, English and French have iso-morphic, although not identical, devices for past-tense reference. Put differently, aspectual sensitivity is part of both systems. While this analysis narrows the gap between French and English, the construction-based treatment of tense also leads us to expect idiosyncratic differences in the functional range of a given tense construction in various languages. Such differences can be motivated in terms of the pragmatic division of labor in the constructional inventory of each language. For example, the French present construction has a wider range of uses than its English counterpart. In French, the present construction expresses partitive meaning in combination with an event radical, as shown in (89) and (90):

(89)   Faites pas attention, Mademoiselle. Il vous *taquine*!

'Don't pay any attention to him, miss. He's teasing you.' (Binet, *Les Bidochon* 2, p. 7).

(90)   Eh bien, à present, je me sens mieux. La morale *revient*.

'Well, now I feel better. My morale is coming back.' (Binet, *Les Bidochon* 8, p. 42)

The coerced stative interpretation in (89) is derived by selection of an intermediate rest in the temporal representation of the input activity. The coerced stative interpretation in (90) is derived by a chained type-shift: the input achievement representation is augmented up to an accomplishment representation via addition; the added activity representation then becomes available for selection. Thus, (90) implies the same slow-motion conceptualization as its progressive translation does in English—the return is not immediate, but has an onset phase.

   The French present construction is also used to denote a present-contiguous state phase when combined with either a state-phase radical or an activity radical, as in (91) and (92), respectively:

(91)   Comme moi, alors! Sauf que moi, c'*est* une affaire réglée depuis quinzes jours.

'Same here! Except in my case the thing [surgery] has been a done deal for fifteen days.' (Binet, *Les Bidochon* 7, p. 25)

(92)   Raymonde: Ça commence à s'éclaircir!
Robert: C'est une chance! Depuis une heure qu'on *attend*!

'Raymonde: It [the waiting room] is beginning to clear out.
'Robert: That's a stroke of luck—considering we've been waiting for an hour.' (Binet, *Les Bidochon* 7, p. 15)

The coerced stative readings in (91) and (92) involve the application of selection to the input temporal representation: the state denoted by the construction represents a posterior rest selected from the temporal representation of the input state phase or activity.

The English present construction shares with its French analog the ability to coerce stative readings of iterated events via selection, yielding habitual and gnomic readings of event-chain radicals. These readings are exemplified for French in (93) and (94):

(93)   Ils *disent* neuf heures à tout le monde. Comme ça, si t'as pas la chance de passer dans les premiers, tu *attends* des heures!

'They tell everyone to come at nine. That way, if you don't have the luck to get in first, you wait for hours.' (Binet, *Les Bidochon* 7, p. 15)

(94)   La pratique régulière du jogging *prolonge* la vie de deux à huit ans!

'Regular jogging prolongs life from two to eight years!' (Binet, *Les Bidochon* 11, p. 36)

The fact that present sentences in the two languages can have generic readings should not be taken as evidence either that generic events are inherently states or that the present designates both iterated events and states. In the present framework generic events can qualify as states, but only by coercion. Thus, the combinatory possibilities exemplified in (91–92) and (93–94) do not lead us to expand the set of situation types that the present construction can denote in French.

Neither the partitive nor present-contiguous state-phase readings are currently expressed by the present construction in English. Bybee, Perkins, and Pagliucca (1994) attribute this fact to a split in the system of present-time reference in English, arguing that English now has two ex-

ponents of present meaning: the simple present and the present progressive, the latter of which "appears to have been generalizing and taking over some of the functions of the Present for several centuries" (Bybee et al. 1994: 144). While I believe that this assessment of the facts is correct, I have a different view of the semantic implications of these facts. According to Bybee, Perkins, and Pagliucca (1994: 152), the present progressive and present tense participate in a privative opposition, in which the present tense is the unmarked member: "the Simple Present carries no explicit meaning at all; it refers to the default situation from which other tenses represent deviations". Because of its bleached semantics, the present can "absorb the meaning inherent to normal social and physical phenomena, and this meaning if described and broken down explicitly, consists of habitual occurrence and behavior as well as ongoing states" (Bybee et al. 1994: 152). The analysis appears to raise more questions than it answers. First, why should states be more "normal" than ongoing events? Second, why should a meaningless construction require a disjunctive definition, involving both ongoing states and habituals? But even leaving these concerns aside, one could not describe the aspectual constraints which the present exhibits, and the coercion effects which it performs, if one did not view it as meaning something. I propose that the present tense is a concord construction in both French and English. In both languages, the present construction denotes a stative type, and therefore must combine with a state radical. Unlawful combinations are "amnestied" as per the override principle.

This proposal differs from previous attempts to address the source of typological variation in the semantic range of the present tense. Cooper 1986, for example, argues that the English present tense is "exotic" in requiring a higher degree of coincidence between speech and situation times than does present-tense inflection in other languages: "the semantic location of the present in other languages requires the discourse [time] to temporally overlap the event [time] rather than be identical with it" (1986: 29). The current proposal locates the relevant typological variation elsewhere. Under this proposal, present constructions are intrinsically state selectors. The selection behavior of the present is a logical entailment, since speech time is a "shallow" interval that does not provide the conditions necessary for verification of an event report. The difference between the English present and its analogs in other languages comes down to coercion potential of each cognate construction: while all present constructions denote stative types, the English present limits the type shifts that input event radicals can undergo.

Why should a construction impose such limitations? A satisfactory answer to this question will certainly involve the effects of quantity-based

inference. Where shift constructions are available to perform a given aspectual mapping, as is the perfect in English, the mapping is unlikely to be performed by a less specialized concord construction, e.g., the present. It remains unclear, however, what conditions favor the diachronic development of shift constructions. While the use of an explicit type-shifting devices can be viewed as a hearer-based accommodation, based upon maximal transparency, the use of an implicit type-shifting device can be seen as a speaker-based optimization strategy, involving economy of effort. These two countervailing factors—effort conservation and informativeness—conspire to ensure a relatively balanced division of semiotic labor, as described by Horn (1984): type-shifting functions are apportioned relatively equally among shift and concord constructions in the grammar of a given language.

6. Conclusion

Aspectual coercion phenomena have been invoked to support modular grammatical architectures, since they entail the presence of meanings which are not linguistically expressed. These same phenomena have here been interpreted in a very different way, as evidence for syntactic patterns that, like words, denote types of entities and events. We assume that the set of types denoted and evoked by constructions is a universal inventory, with typological differences arising from the variegated restrictions which constructions within a given semantic domain place upon the lexically expressed types with which they can unify. On this assumption, it makes sense to ask why two constructions which denote the same type, e.g., the English progressive and the French imperfective, exhibit the divergent combinatory and interpretive constraints that they do. The combinatory constraints result from the distinct functions of shift constructions and concord constructions. The interpretive constraints result from the discourse-functional oppositions which characterize the aspectual grammar of each language.

As a theory of meaning construction, sign-based syntax can be seen as freeing semantics from the limitations of lexical licensing while at the same time retaining the syntactic basis of semantic composition. The enriched representations predicted by the override principle are not derived from a special form of composition, but are instead produced by competition between lexical and constructional meanings. On this account, coercion is the resolution of conflict between linguistic cues which do not ordinarily compete during interpretation. As in other cases of formal conflict resolution (e.g., those involving disparate acoustic cues in auditory perception, as described by Ohala 1996, among others) interpreters

are biased toward a particular cue. Interpretation favors syntactic mean-
ing over lexical meaning.

Notes

1.   The idea that constructional requirements may override lexical requirements in the case
      of NPs like *a beer* is not part of the conception of construction grammar put forth in
      Kay and Fillmore 1999. In those versions of the model, conflict of this type would
      represent a unification failure, since the [bounded−] feature of the noun *beer* would
      conflict with the [bounded+] requirement that the indefinite-article construction im-
      poses upon its nominal daughter. In the afore-referenced works, the licensing of tokens
      like *a beer* necessarily involves *type-shifting* constructions. A type-shifting construction
      has an *external semantic value* which is distinct from that of it sole daughter node. The
      Mass ≫ Count construction, for example, unifies with a mass noun like *beer*. Its exter-
      nal semantics is that of a count noun, which can thereby unify with the construction
      that licenses indefinite NPs (as the head daughter of that construction). Type-shifting
      constructions are essentially lexical rules, and as such fail to capture an important
      generalization, since type-shifted nominals are freely generated but not in any way in-
      dexed to the morphosyntactic contexts which trigger the relevant type shifts. Further,
      use of the 'box-within-a-box' constructions for type-shifting violates the spirit of a
      model which, in the interest of concreteness, eschews nonbranching domination in
      phrase structure. That is, in construction grammar, no phrase consists simply of a
      noun. If a given lexical noun is of the appropriate semantic class, it will simply unify
      directly with any grammatical-function position in a construction. In accordance with
      Goldberg (1995), I therefore employ a version of the construction grammar architec-
      ture which allows for unification with overrides, as per the override principle described
      in section 3.

2.   The mapping which shifts states to state phases, while unproblematic at the level of
      causal structure, presents a problem for temporal representation. At the level of causal
      structure this mapping involves the addition of the operator HOLD, a single component
      of causal representation. This mapping conforms to the constraint on minimal tran-
      sitions. At the level of temporal representation, however, this mapping violates the
      constraint on minimal transitions, since it involves the addition of *two* components of
      temporal representation: the onset and offset transitions. Bickel (1997: 124–126) solves
      this problem by assuming that the temporal representations of states include an onset
      transition. Under this assumption, the shift to an episodic reading involves only the
      addition of a single (terminal) transition. Since, however, this solution neutralizes the
      grammatically relevant distinction between state and achievement representations, I do
      not adopt it here.

3.   In a construct—a linguistic string licensed by a unified combination of constructions—
      any unspecified values (as for the maximality attribute of a mass noun) will be "filled
      in", as definite determination imposes a [max-] value on its nominal daughter.

4. See Zwicky (1994) for a discussion of construction-based grammar as a model of non-local licensing relationships (e.g., ''niece licensing'', in Zwicky's terms) and exocentric determination of syntactic category membership.

5. By modeling inflectional morphology as syntactic combination, we potentially incur violations of the principle of lexical integrity, as discussed by Bresnan and Mchombo 1995. This principle states that elements of morphological structure are not subject to syntactic processes, e.g., recursion. Thus, the plural suffix cannot be paired with a co-ordinate nominal head, although nothing in the representation in Figure 3 would seem to prevent this. While I leave open the question of how constructions like plural (and the imperfective construction to be discussed below) might be brought into line with lexical integrity, I maintain that inflectional morphology is appropriately represented by constructions, since concord constraints upon sisterhood relations provide a model of coercion effects which exactly parallels that given for syntactic structures like indefinite determination.

6. The label *SM-determination* refers to the construction which combines the unstressed determiner *some* with a nominal head denoting a mass type.

7. While the complement of the progressive auxiliary *be* belongs to the syntactic category VP, its semantic type is that of event. Via coinstantiation, the subject requirement of the head verb of the VP complement is satisfied, i.e., ''accounted for'', since it unifies with the NP which serves as subject of the finite auxiliary. Notice that we need not assume, as is traditional in the transformational tradition, that the complement of the auxiliary is ''syntactically'' a sentence.

8. As we have seen, the activity class includes not only homogeneous activities of the *sleep*-type but also events of the *run*-type, consisting of iterated subevents. This division within the activity class leads us to predict that progressive-form stative predications may have readings otherwise associated with heterogeneous activity sentences. It would appear at first glance that progressivized state sentences which express the accretion of a property have such readings:

   (i)   I'm believing your story more and more.
   (ii) I'm seeing the picture with increasing clarity.
   (iii) I'm liking each song more than the last one.

The fact that the stative verbs in (i–iii) are paired with comparative adverbials, e.g., *more and more*, suggests that they have heterogeneous-activity readings, since ordinarily only heterogeneous activities are compatible with such adverbials, as in *She ran faster and faster*. Adverbials denoting ''accretion'' of a gradient property are incompatible with telic predications, as shown by the ill-formedness of the sentence *She broke the glass faster and faster*. Such adverbials are also incompatible with state predications, as shown by the ill-formedness of *She is a French professor more and more*. However, the comparative adverbials in (i–iii) need not be taken as symptomatic of a construal imposed by the progressive construction. Instead, these adverbials can be viewed as themselves coercing activity readings. For example, a predication whose head is a state verb denotes a set of iterated episodes when combined with a comparative adverb:

(iv)   She liked that song more each time she heard it.

It could be argued that (iv) constitutes a state sentence rather than an activity sentence, since it could as easily be presented in the simple present tense, as in (v):

(v)   She likes that song more each time she hears it.

As I will argue below, however, the mere fact of co-occurrence with the present tense is not evidence of stativity, since the present tense can coerce stative readings of otherwise perfective predications. For this reason, I will reject Langacker's (1996) division between habitual sentences, as in (iv), and repetitive-event sentences, as in (v). Both (iv) and (v) represent iterated-event sentences, i.e., activities. In the case of (v), however, the present-tense construction has imposed an imperfective (state) reading on what would otherwise be an activity predication.

9. Mittwoch (1988) and Parsons (1990) argue for a similar solution.

10. The representation of the syntactic category and phonological form of the English past and present constructions, as well as of the French imperfective and perfective constructions, will depend upon the formal expression of these values. In English, for example, the past value may be expressed by a suffix or it may be expressed by a vocalic alternation. Following Bybee (1995), I will assume that inflectional morphology can be represented by schemas with greater and lesser degrees of productivity, depending upon how "open" or "closed" the schema is. An open schema will have the branching structure shown for the French imperfective in Figure 8. The extreme case of a closed schema is that of suppletive morphology. Suppletive past-tense verbs, e.g., *went* and *was*, are polysemous; they have both event and state values, mirroring the meanings of the two past constructions. Since words and constructions differ only with regard to internal complexity and not with regard to their signifying capacity, all exponents of tense, from highly productive suffixes to suppletive forms, denote event types.

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