

Aspectual verbs and the “coercion” effect

Background: It has been proposed that aspectual verbs like *begin* carry a selectional restriction and must combine with an event-denoting complement as in (1-a) (Pustejovsky 1995, Jackendoff 1997). Evidence in support of this restriction comes from the observation that even in sentences where the complement denotes an individual of the ordinary sort, only an eventive interpretation is obtained. That is, (1-b) can only be interpreted as making reference to some event involving a book with John as its agent. The contrast in (1-a) and (1-b) has been investigated in the experimental literature as an instance of the broader phenomenon of **type coercion**. The hypothesis is that complements denoting ordinary individuals must change their semantic type to that of events in order to resolve the type-mismatch with aspectual verbs.

- (1) a. John began/continued/finished *writing the book*.
- b. John began/continued/finished *the book*.
- c. John read/dropped *the book*.

As it turns out, when sentences like (1-b) are compared with sentences like (1-c), processing cost is observed for the (1-b) set (McElree et al., 2001, Pylkannen & McElree, 2007, Husband et al., 2011, Katsika et al., 2012). The manifestation of this rather robust effect has in return been taken to support the type-shifting approach as providing not only a semantically sound but also a psychologically viable understanding of aspectual verbs.

Problem: The approach to aspectual verbs outlined above faces a challenge from data such as in (2). Specifically, in addition to the agentive readings of the subject denotation, as in (1-a-b), transitive uses of aspectual verbs give rise to at least two other readings for their subject denotations – the patientive/undergoer reading (2-a-b) and the constitutive part reading (2-c-f). The patientive readings have traditionally been classified as involving the raising versions of aspectual verbs (Perlmutter 1970, also Pustejovsky 1997). [✓ marks web-attested examples.]

- (2) a. John *began* to bleed.
- b. The paint *began* to peel. (✓)
- c. A little porcelain pot *finished* the row. (✓)
- d. Defoe (1661–1731) *begins* the list of writers of the period of people’s influence...(✓)
- e. This conclusion *finished* the first day’s activities and the staff adjourned.(✓)
- f. On the Indian side, Dharamsala *begins* the Himalayas.

Consideration of this broader range of data indicates that aspectual verbs (at least the core class consisting of *begin*, *start*, *finish*, *end*, *continue*) must be analyzed as semantically neutral with respect to the ontological categories they make reference to. Contra the assumptions of the type-mismatch and repair approach, their basic meaning generalizes over (at least) events and individuals (and is extendable straightforwardly to intervals and locations). Accordingly, we submit that the assumption that aspectual verbs select for eventive complements whose initial, medial, or final sub-events they make reference to, is too narrow a characterization of their semantic behavior. We present an analysis that makes explicit how a generalized meaning of an aspectual verb interacts with the semantic properties of its arguments, leading to the ‘agentive/patientive readings of the subject denotation on the one hand, and the ‘constitutive-part’ readings on the other.

Analysis: The ontology includes objects (type *e*) and events (type *v*). The variables, *t*, *t'*, *t''*... range over individuals of any sort: i.e. object or events and *T* ranges over **totally ordered sets** of objects and events. The basic schema that we propose for aspectual verbs is illustrated here with the lexical entry for *begin* in (3-a) and *finish* in (3-b). *begin* combines with some totally ordered

set T of individuals of any simple type σ and an entity t of any simple type τ and returns the proposition that there is some function f such that the value of f at the least element of T is t .

- (3) a. $\llbracket \text{begin} \rrbracket = \lambda T_{(\sigma,t)} \lambda t_\tau \exists f_{(\sigma,\tau)} [f(\mathbf{inf}(T)) = t]$
 b. $\llbracket \text{finish} \rrbracket = \lambda T_{(\sigma,t)} \lambda t_\tau \exists f_{(\sigma,\tau)} [f(\mathbf{sup}(T)) = t]$

Since *begin* and its kin require a totally ordered set as their first argument (the complement), any simple-type expression that they combine with is shifted via the operator **set**. **set** maps an individual of any type to some set of its parts totally ordered along a contextually given parameter $c(\leq_c)$. For any individual t then,

- (4) $\mathbf{set}(t) =_{def} \{t' | t' \leq_c t \ \& \ \forall t'', t''' \in \mathbf{set}(t) [t'' \prec t''' \vee t''' \prec t'' \vee t'' = t''']\}$

Thus, **set**(the book) may, modulo context, map the book to the set of its chapters, the set of its sentences, or to the set of its (totally ordered) subnarratives.

Accounting for the readings: The core data with agentive readings of the subject denotation (as in 1a-b) as well as the broader range of readings seen in (2) can be accounted for uniformly from the assumptions above.

The agentive reading (1a-b) can arise when the complement of *begin* is event-denoting as in *John began writing the book*. Here, **set** maps the event of writing the book to the set of its totally-ordered sub-events. *begin* combines with this set and with the individual John, and the resulting proposition is that some function relates the initial sub-event of **set**(writing the book) to the individual John – for instance, the agent function.

- (5) a. $\llbracket \text{begin writing the book} \rrbracket = \lambda T_{(\sigma,t)} \lambda t_\tau \exists f_{(\sigma,\tau)} [f(\mathbf{inf}(T)) = t](\mathbf{set}(\text{writing the book}))$
 $= \lambda t_\tau \exists f_{(\sigma,tau)} [f(\mathbf{inf}(\mathbf{set}(\text{writing the book}))) = t]$
 b. $\llbracket \text{John begin writing the book} \rrbracket =$
 $\lambda t_\tau \exists f_{(\sigma,\tau)} [f(\mathbf{inf}(\mathbf{set}(\text{writing the book}))) = t] (\text{John}_e)$
 $= \exists f_{(\sigma,\tau)} [f(\mathbf{inf}(\mathbf{set}(\text{writing the book}))) = \text{John}_e]$

In the case of *John began the book*, **set** maps the book to the set of its constitutive parts (physical or narrative). *begin* combines with this set and with the individual John and relates the least element of this set to the individual John via some function. We call this underspecified function the *traverser* function. The **patientive** readings in (2a-b) can be derived similarly in a transparent way.

The **constitutive part** reading (2 c-f) arises when the function that relates the subject denotation to the set complement is identity. In the case of *The little porcelain jar finished the row*, **set**(the row) is the ordered set of the individuals making up the row starting from some end. Assuming identity as the relevant function, the porcelain jar is asserted to be the greatest element of this set.

Accounting for the processing cost: In cases like *John began the book*, our analysis shifts the processing burden from the application of type-shifting to the simpler and more widely observed operation of ambiguity resolution. The parser, upon receiving the string corresponding to the subject and combining it with the aspectual verb, expects to compose it with the ordered set provided by the complement. The nature of this set, and consequently, the function that relates the distinguished element of this set with the subject denotation, remains undetermined. The cost occurs from the resolution of the ambiguity that is required by the presence of multiple possible readings. No special event has to be built via type-shifting, no mismatch has occurred, and no repair is required.