Reframing aspectual composition: constructions, event structure and simulation

Languages employ a wide range of devices that can affect aspectual interpretation. Besides explicit grammatical markers of tense and aspect, many lexical and phrasal constructions impose specific constraints on event structure; all of these interact with contextual factors to produce subtle differences in interpretation and acceptability:

(1) Harry [lives / is living / has been living / has lived] in Berkeley.
(2) Mary read the book [in an hour / for an hour].
(3) Terry [swam / sneezed / left] for an hour.

While purely syntactic accounts can license particular tense-aspect verbal combinations (such as the English simple present, progressive and perfect markings exhibited in (1)), they do not explain differences in how temporary or persistent the depicted situation may be. Likewise, the structurally similar sentences in (2) and (3) demonstrate that temporal modifiers can produce different inferences with respect to the completion of a goal (e.g., whether a book has been read in its entirety), and their combination with different verbs can differ in whether the modified interval describes a continuous activity (swimming), an iterated sequence of events (multiple sneezes) or a bounded resulting state (of absence).

Approaches to aspectual interpretation typically classify verbs according to their inherent properties, as exemplified by Vendler’s [1] four-way taxonomy of states, activities, accomplishments and achievements. Such classes are often further characterized in terms of features (whether they are stative, telic, punctate, perfective, etc.) that constrain their appearance with other constructions [2,3]. But acceptability judgments depend on properties of the sentence as a whole, and they are also notoriously susceptible to both conventional and context-mediated type coercions. A more complete account thus requires a principled means of combining aspectual constraints from disparate constructions, as well as a richer model of event structure that not only identifies relevant features but also captures their dynamic interactions in context.

The approach taken here addresses these requirements by combining a construction-based grammatical framework with an underlying simulation-based semantic model. Previous work in simulation semantics [4,5] has established a fine-grained dynamic event representation motivated by features of motor control; this representation is capable of modeling event stages, resource consumption and production, iteration, hierarchical structure, state changes, duration and other key event properties. This simulation-based model serves as the underlying semantics for Embodied Construction Grammar [6], a construction-based grammar formalism that further constrains meanings to parameterize simulations using frame-based, embodied representations. These schematic structures provide a limited interface between grammar and simulation: constructions need only specify their compositional constraints in terms of these schemas, allowing simulation to account for the potentially unbounded range of context-dependent inferences and coercions. We define the schemas relevant to both basic aspectual classes (states, continuous processes and discrete transitions) and more complex aspectual combinations, as well as a variety of constructions that constrain aspectual structure, including verbs, auxiliaries, argument structure constructions and temporal modifiers. We show how interactions among these constraints and with the situational context can give rise to both the basic interpretive patterns illustrated above and more challenging aspectual phenomena. The resulting account demonstrates how a unified approach to integrating specifically linguistic knowledge with richer embodied representations can elegantly capture context-dependent syntactic and semantic generalizations.

References
