

Generalized Paths

Jean Mark Gawron, San Diego State University, gawron@mail.sdsu.edu

The sentences in (1a) and (1b) illustrate alternations between event and state readings with the verbs *extend* and *cover*. The sentences in (1c) and (1d), while not ambiguous, show one verb, *zigzag*, alternating between an event and state reading. The three verbs in (1) thus all have event readings entailing motion of the subject (which we will call the *figure*), as well as state readings entailing no motion (Jackendoff 1990, Jackendoff 1996, Talmy 1985). Sentence (2a) illustrates a related ambiguity with the degree-achievement *widen*; the event reading of (2) describes a change with respect to time, the widening of a crack in a certain place, say, part of a wall; the state reading describes a *change with respect to space*, the crack, presumably narrower elsewhere, is wider in the region near the north gate. The shared properties of this ambiguity with the ones in (1) are the following: (a) the event reading describes a change with respect to time ; (b) the state reading describes a bounded region of space within which some state function ranges over *parts* of the figure, the point of extension or the covering of a surface region or the width of part of the figure. This paper explores a unified treatment of the phenomenon, incorporating degree achievements like *widen*, *fill*, inchoative appearance verbs like *gild*, and path-shape motion verbs like *zigzag*.

One possible account of these ambiguities is by way of an inchoative operator (an option explored in Jackendoff 1990 and later abandoned in Jackendoff 1996). The key objection to this account is that event and extent readings alike can entail change, as is best seen with degree achievements: The wall in (2a) must change in width from one location to another. This is illustrated further in (3). The neutrality of *widen* between activity and accomplishment, seen in (3a,b), is preserved in the state readings if spatial intervals are used: (3c) is a “spatial accomplishment”; (3d) a spatial activity.

The analysis proposed here is that these “ambiguities” can be handled not as cases of different lexical semantic structure, but simply as differences in what kind of index the change inherent in the lexical semantics is evaluated against. Indices are simply ordered sets. State readings arise when a state function is evaluated with respect to an ordered set of spatial indices; event readings when it is evaluated with respect to an ordered set of temporal indices; the sets used are either sets of spatial *slices* (a spatial slice is a plane perpendicular to some directed axis), or of temporal slices. The necessity for ordering in the spatial indices is illustrated in (5), adapted from Fong (1997); the same road may both widen and narrow at a single location depending on which way the slicing axis is pointed; (4a) shows the definition of SLICE, the state function that tracks the location of an entity *x* with respect to a slice, used for all spatial path verbs, including all motion verbs and verbs like *extend*; (4b) shows the analogous state-function *width*, the state function that tracks the width of an entity *x* with respect to a *slice*. This is just the same width function used in Kennedy (1999) for *wide* but generalized to slices, and with that generalization, the INCREASE operator of Hay et al. (1999) carries over here to give event and state readings for degree achievement verbs. A key feature is the analysis of path modifiers as properties of state functions, which explains contrasts in the *incrementality* of path modifiers. In (6a), the fog may materialize simultaneously over the entire point-to-peninsula span; in (6b), it must move incrementally from point to peninsula. This is due to the fact that the range of the state function of *cover* is the degree scale of coveredness; therefore *cover* does not assert covariance between time and locations; the state function of *extend*, on the other hand, is SLICE, which does track location incrementally with respect to time.

Assuming that this phenomenon provides motivation for the semantic constituency of state functions (generalized paths), we move on to address potential consequences for lexical semantics; we address the status of state-functions for achievements and the case of spray-load verbs, which seem to be a class of two-argument state functions.

- (1)
 - a. The fog extended from London toward Paris.
 - b. Snow covered the valley (from the road to the ridge).
 - c. The road zigzagged up the hill.
 - d. The halfback zigzagged to the goal line.

- (2)
 - a. The crack widened at the north gate. (event and extent readings)
 - b. narrow, warm, cool, rise, fall, darken, lighten, brighten, dim, color verbs

- (3)
 - a. The crack widened five inches in five minutes.
 - b. The crack widened for several hours.
 - c. The crack widened five inches in five yards.
 - d. The crack widened for several yards.

- (4)
 - a. $\text{SLICE}_D(x, s) = l$ iff $x \sqcap s = l$. A function returning the location of the stage or portion of x occupying slice s of ordered slice domain D .
 - b. $\text{width}_D(x, s) = d$ iff the width of $x \sqcap s$ is d .

- (5)
 - a. The road from Ukiah to Boonesville widens at the mall.
 - b. The road from Boonesville to Ukiah narrows at the mall.

- (6)
 - a. Fog gradually covered the bay from the point to the peninsula.
 - b. Fog gradually extended from the point to the peninsula.

1 Bibliography

- Fong, Vivienne. 1997. A diphasic approach to directional locatives. In A. Lawson (Ed.), *Proceedings from Semantics and Linguistic Theory VII*, 135–150. Cornell University: CLC Publications.
- Hay, Jennifer, Christopher Kennedy, and Beth Levin. 1999. Scalar structure underlies telicity degree achievements. In *The Proceedings from the Ninth Conference on Semantics and Linguistic Theory: SALT IX*.
- Jackendoff, Ray. 1996. The proper treatment of measuring out, telicity, and perhaps even quantification in english. *Natural Language and Linguistic Theory* 14:305–354.
- Jackendoff, Ray S. 1990. *Semantic Structures*. Cambridge, MA: The MIT Press.
- Kennedy, Christopher. 1999. *Projecting the Adjective: The Syntax and Semantics of Gradability and Comparison*. New York: Garland.
- Talmy, Len. 1985. Fictive motion and 'ception'. In P. Bloom, M. A. Peterson, L. Nadel, and M. F. Garrett (Eds.), *Language and Space*, Vol. 3. Cambridge, MA: MIT Press.