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The title:

A topological approach to space - time mappings

Abstract:

In this talk, we will discuss metaphorical mappings from space to time, assuming that there is a topological equivalence between space and time, and show how we can formalize the equivalence.

We will start by observing that there is a need to introduce a topological approach to natural languages. For instance, to understand a sequence of sentences such as "Alice jumped over the hedge. She failed to land safely and sprained her ankle," we must know that (i) there is a location where Alice leaves the ground and a location where she lands on the ground, (ii) there is a "barrier" ('hedge') that prevents Alice from keeping going, (iii) there is a continuous path between the two locations, and so on. Topological properties of words have been studied not only in cognitive linguistics but in other semantic fields (Lakoff and Johnson 1980, Talmy 1983, Lakoff 1987, Boroditsky 2000, and for more theoretical attempts Pinon 1993, Zwarts and Winter 2000, Zwarts 2006). But these are not comprehensive enough to treat or formalize topological information such as (i) to (iii), or various types of metaphorical mappings from space to time. We will propose a different approach.

Using our approach, we will analyze movement verbs, "too-ru ('walk through')," "wata-ru ('cross over')" and "koe-ru ('cross over')" in Japanese, which are also used to express temporal expressions. We will show that a variety of their usages can be explained if we assume a topological equivalence between space and time. (The rough idea of 'topological equivalence' can be described as follows: let's compare (a) "to skip over a small pool" to (b) "to skip over Saturday and Monday." In (a), a trace has a gap (= 'small pool'), in other words, the trace is a set of two lines that are discontinuous. The same type of discontinuation can be seen between Friday and Monday in (b).)