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Analysing discourse relations in natural language: The case of space and time

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Objectives and Scope

Discourse relations are links between utterances and sentences or sentence parts. These can be implicit or explicit through markers such as *because*, *before*, *but*, etc. Thus, the causal discourse relation between the two clauses that is explicit in 'He fell because he stumbled over a stone' can be inferred in the sentence 'He stumbled over a stone and fell'. Much research in this field focuses on the range of ways in which these connections can be established and inferred by the recipient (or analyst). However, the *use* of such markers in discourse also shows how a speaker conceptualizes the relationships between various aspects of what they are saying. Whenever they occur in discourse, they are therefore reflections of the speakers' mind in this respect.

In this tutorial, we will explore these effects by focusing on how speakers conceptualise and express relationships in time and space in discourse (Tenbrink, 2007). In the first half, we will discuss the linguistic options in this regard, and work out some principles for (and differences between) temporal and spatial relationships. In the second half, we will look at how these effects can be investigated by a systematic analysis of speakers' discourse produced under controlled circumstances. This includes a brief introduction to the methodology of Cognitive Discourse Analysis, with a focus on relationships between spatial and temporal elements in discourse.

Discourse Relations in space and time

Discourse relations are structures in discourse that connect various linguistically expressed elements meaningfully to each other in the language user's mind (Sanders et al., 1992). These effects have been investigated in multiple ways and come under various names, such as Conjunction in Hallidayan theory (Halliday & Matthiessen, 2014), and rhetorical relations in RST (Mann & Thompson, 1988). Explicit markers can connect different kinds of structural elements, such as clauses, sentences, phrases, and more, depending on the type of connector and other linguistic or conceptual choices.

The domains of space and time are particularly interesting in this regard. As fundamental domains of human experience, they are conceptually connected (Piaget, 1946) and can sometimes be used interchangeably, as in 'follow the road for five minutes / for about 300 yards' Moreover, temporal terms are, to some extent, semantically and historically based on spatial terms (Clark, 1973; Haspelmath, 1997). Thus, explicit markers of temporal and spatial relationships (e.g., prepositions like *after* and *behind*) have much in common. Both represent schematic rather than precise metric relationships, and both rely on some kind of conceptual reference frame (Tenbrink, 2011), albeit in different ways for different kinds of structures.

Nevertheless, in natural discourse the expression of temporal relations between *events* differs systematically from the expression of spatial relations between *objects* in rather fundamental ways, related to the ontological differences between objects and events (Tenbrink, 2007). For instance, in the spatial domain objects are typically conceptually related through their *functions*, which affects language use systematically (Coventry et al., 1994). In the temporal domain, language use is crucially affected by various kinds of *causal* concepts: if events are reported as following after one another (as in 'He stumbled over a stone and fell') a causal relation will typically be assumed, as long as this is in accord with world knowledge. These basic concepts affect patterns of language use in different ways in the two domains, depending on the communicative context.

Cognitive Discourse Analysis

To examine patterns and effects of expressing temporal and spatial relations in natural discourse, it is useful to adopt a systematic approach that relates linguistic choices to features of the situation in which language is produced. Cognitive Discourse Analysis (CODA; Tenbrink, 2015) was designed to address features of language use that reflect concepts and cognitive processes systematically, including the conceptualisation of relationships between objects and events. Linguistic features sometimes convey more than what the speaker is aware of, and more than what linguistic content explicitly expresses. For instance, an utterance like *to the left of the cupboard* presupposes an underlying perspective that defines the *left* side without stating it explicitly. Conceivably, the same spatial relationship could have been expressed in other ways (e.g., *in front of the cupboard* using a different perspective, or *next to the cupboard* using a less specific lateral term). Speakers are typically not consciously aware of the *network of options* (Tenbrink & Freksa, 2009) that allows for other linguistic choices beside their own.

The significance of such linguistic and conceptual choices emerges more clearly by considering a larger data set collected under controlled circumstances. By systematically

analysing speakers' choices of relating objects and events in space and time to each other, the analyst can identify features of the cognitive and communicative circumstances that lead to the preference of particular types of expressions in natural discourse. Insights in cognitive linguistics and beyond support the interpretation of these patterns of language use, and behavioural performance data contribute further insights through triangulation (e.g., Hölscher et al., 2011). This kind of empirical approach is suitable for investigating spatial and temporal cognition through the analysis of language use, addressing how spatial environments and temporal structures are conceptualised and which features of the spatial and temporal situation affect these concepts in the human mind.

Format and organization

This tutorial is designed to cover a half day (three hours) and will be interactive, connecting where feasible to participants' prior experience with any of the elements covered in the tutorial: discourse relations, spatial and temporal language including reference frames, discourse analysis, and empirical studies in cognitive science. Contents can be adapted to some degree according to participants' interest, prioritising theoretical insights or practical aspects of data collection and analysis as desired. Participants will be encouraged to consider relevant research studies in their own current or future work, in light of the theoretical and practical aspects discussed in the tutorial.

Target audience information

There is no prerequisite for taking this tutorial. It is open for researchers in cognitive science at any point in their career, ranging from graduate students to established experts. It is particularly relevant for those who consider collecting (or have already collected) natural language data to address questions about the human mind, and in particular conceptualisations of space and time.

Tutor Information

Thora Tenbrink is Reader in Cognitive Linguistics at Bangor University (Wales, UK), and uses linguistic analysis to understand the human mind. For this purpose she has developed Cognitive Discourse Analysis (CODA, Tenbrink, 2015). She is author of "Space, Time, and the Use of Language" (Mouton de Gruyter, 2007), has co-edited three books on spatial language, representation, and dialogue, and is co-organising UK-Cognitive Linguistics Conference 2016 and CogSci 2017. Current research includes cognitive strategies in problem solving tasks such as Origami paper folding, route planning, and wayfinding under conditions of uncertainty, and spatial communication and dialogue. See http://knirb.net for further information.

Previous instantiations

This tutorial has previously been offered as an invited workshop at Fribourg University, as part of the CRUS Doctoral Programme Language & Cognition, November 24, 2015. The methodology Cognitive Discourse Analysis (CODA), which will be introduced here as a method to analyse discourse relations systematically in elicited discourse, was presented on many previous occasions (see http://knirb.net for details, and Tenbrink et al., 2012, for a report). This includes a theme session at ICLC 2015, workshops at UK-CLC 2014 in Lancaster (UK), at ETH Zurich, and at Bremen University, tutorials at CogSci 2013, ICCM 2012 and 2013, Spatial Cognition 2012, and COSIT 2011, and a summer school course at Bangor University. The language of space and time was a topic at a panel at IPrA 2007, and the language of space was further presented as a summer school course at UCSB in 2013, as a workshop in 2005, and in many presentations over the past decade.

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