EXTENDED ABSTRACT

Contrast sets in spatial and temporal language

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Introduction

How do speakers choose suitable words for a description, and how do recipients identify the intended interpretation out of the wide range of (partly overlapping) meanings as defined in a dictionary or encyclopedia? Spatial and temporal terms such as *left, front, before, after, long, wide, in,* and *out* are particularly intriguing as they involve not only an intricate relationship to the spatiotemporal context and its mental conceptualization, but also a vast potential for extended (e.g., metaphorical) meanings. Furthermore, they are typically associated with relative and qualitative, rather than absolute or quantitative metric concepts, allowing for a great variety of interpretations. A lexical item like *long*, for example, may be conceived of as the opposite of *short*; but the absolute size of the entity referred to remains unspecified. Furthermore, *long* may also be interpreted as contrasting with *wide* or *broad*, or it may specify linearity rather than extendedness, and it could be similar in meaning to *big* or *tall*. Additionally, it may refer to spatial as well as temporal or further extended domains, as in *a long text*.

As this example indicates, a central aspect of interpreting the meaning of utterances lies in identifying those aspects that the utterance contrasts with, ruling out conceivable alternatives. As Nemo (1999, p. 353) points out: "what is said (or asked) is relevant insofar as it makes a difference", namely, a difference to the set of alternatives that the utterance distinguishes. This aspect of linguistic communication has been widely discussed and investigated from a number of perspectives as part of various theoretical approaches to the semantics/pragmatics interface, for example, *Relevance Theory* (Sperber and Wilson 1986), *Functional Grammar* (Halliday 1985), and *Alternative Semantics* which extends the idea to claims of truth-conditional effects, cf. Rooth (1992). In this theory-neutral contribution, we apply the general idea to the interpretation of spatial and temporal language in order to specify how differences in the contextual contrast sets inform the interpretation of a particular subclass of linguistic items, namely, spatial and temporal terms.

Method

Our aim in this paper is to take a systemic perspective on spatial and temporal linguistic expressions. We draw on insights from various sources in order to determine how the contrast set can be identified that leads to a suitable interpretation of spatiotemporal terms according to context. In particular, we address the potential impact of the current domain and thematic context, the linguistic context and (prosodic) focus, and the situational context. All of these areas contribute in different ways to the identification of a relevant contrast set.

Results

Each term is part of a (conceptually based semantic) network of options that is generally available; contextual (pragmatic and situational) factors then delimit the specific options and their associated interpretations. The precise choice of words reflects the speaker's concept of the situation as well as their assessments of relevance in systematic ways. This concerns, for instance, the chosen level of

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granularity, choices from a set of semantically similar items (as with a thesaurus), and the relevant aspects of encyclopedic lexical entries. Next we sketch briefly how these principles work for three kinds of contextual factors: linguistic, domain-related, and situational.

Domain and thematic context contribute the identification of a term with respect to its currently relevant connotations, possibly ruling out or enhancing distinct meanings in cases of polysemy. Thus, whether a term like German *vor* (*before/in front of*) should be interpreted in contrast to *nach* (*after*) or *hinter* (*behind*) is typically resolved by the domain context the utterance occurs in. Likewise, the spatial term *in* has a meaning in many different domains; the intended domain can usually be determined directly by the collocated lexical items (e.g., *in the vase* vs. *in time* vs. *in the paper*). Furthermore, particular lexical items chosen for a description out of the range of alternatives (similar items in a thesaurus) depend not only on topic domain but also on the type of discourse at hand plus a range of sociolinguistic factors. Thus, *behind* contrasts with *in back of* on the level of dialect, and *oblique* contrasts with *diagonal* and *kitty-corner* stylistically; these additionally differ in their particular range of applicability in context.

Linguistic context and (*prosodic*) *focus* determine whether the intended contrast set centers on the spatio-temporal term or elsewhere. Depending on the context, the spatiotemporal term may be more or less relevant for conveying the intended meaning relative to other parts of the clause. In spoken language, prosodic focus is used to establish the contrast set that is at stake for the current utterance; written language conveys this information via information structure and the previous discourse. If an utterance like *the box on the left* has its (prosodically or contextually conveyed) focus on *left*, then the contrasting alternative is *right*, as made explicit by *the box on the left, not the one on the right*. If *box* were in focus instead of *left*, then the contrasting alternative could be expressed by *the box, not the hat on the left*. Similarly, if a temporal term (*before*) is in focus, the contrast is *after*, which can be made explicit by saying *I coughed before, not after I sneezed*.

Linguistic focus directly affects the scope of conceptual inferences that can be derived from a description. For instance, if events are temporally related in an utterance, a natural inference is that they are also causally related, as in *He fell after he stumbled over a stone* (Heinämäki 1974). In this case, it seems likely that the speaker wants to rule out alternatives like the following: *He fell after he stumbled over a stone, not just out of clumsiness*—rather than emphasizing the temporal relationship (*after* rather than *before*). In such cases, an indefinite range of possible alternatives may arise, due to the wide range of possible causes. Somewhat similarly, for many spatial terms such as *in, on,* and *over*, functional relationships are relevant (Coventry and Garrod 2004). Thus, a sentence like *The flower is not in the vase* may indicate that the flower's spatial relationship to the vase is not sufficient to ensure control; but only if the linguistic focus is on the spatial term. If the linguistic focus is on *the vase*, the relevant contrast set concerns other types of containers rather than the extent of functional control exerted by the vase. Generally, therefore, the identification of a suitable contrasting alternative is straightforward if the term in focus possesses a clear opposite (particularly in a given context). The temporal or spatial relationship affects the relevant contrast set only to the extent to which it is relevant and in focus.

Situational context is particularly relevant for spatial expressions. Each description of a spatial situation can be analyzed as representing one of a number of alternatives on a certain level of granularity. At a coarse level of granularity, independent of context, an expression like *left* is a (permanent) member of the contrast set *left/right*. This is determined by the semantics of the dimensional terms, which allows for a maximum interpretation of the expressions on a half-plane (Herskovits 1986). Thus, a simple description like *left* contrasts with *right*. Alternatively, it can also contrast with *front* and *back* if the applicability regions are conceptualized (in relation to a specific situational context) as being more restricted, even perhaps mutually exclusive. At a much finer level of granularity, *left* may contrast with *slightly left* or *diagonally left* and the like (cf. Freksa and Barkowsky 1996).

The level of granularity invoked by a modification of a spatiotemporal term is systematically related to the type and amount of information required in a situation (cf. Grice 1975). For instance, if a particular spatial setting allows for unambiguous reference on the basis of a coarse distinction, a description like *the left one* is sufficient. Depending on requirements of the situation, for example due to the presence of competing candidates for reference (cf. Freksa 1999), descriptions may become more precise (modifying scale) or add further information (modifying the semantic focus of granularity). For instance, *furthest left* establishes a contrast not only to objects on the right half-plane, but additionally to objects that are not as far to the left. And *left corner* provides the additional information that the object is situated near a corner on the left half-plane, which distinguishes it from all other corners and from all other objects on the half-plane which are not as close to a corner. Thus, the more complex the spatial description gets, the narrower the alternatives can get, and with them the possible positions of other, competing objects, until a maximum density of alternatives is reached (in terms of speakers' cognitive and linguistic abilities in differentiating between alternatives).

Gradable spatiotemporal items such as *long, late,* and *big* can be specified along a relative scale by linguistic items such as *extremely, very, fairly, somewhat, not very* etc. (referred to as *amplification of focus* by Martin and Rose 2003). Such relational structures are universal and can be applied to many different concepts. They always indicate a set of conceivable alternatives that contrast with the current item by being either *less* or *more* in relation to the current scale of meaning, which is determined by the type of concept conveyed by the particular lexical item that is being amplified.

Not all spatiotemporal terms exhibit the same degree of flexibility concerning the available contrast sets. For instance, the topological term *in* typically contrasts with *out*; the semantics of these terms concerns functional and/or geometric containment (Coventry and Garrod 2004), which is typically a binary distinction rather than a matter of degree. That is, whether an object is conceived of as *in* another object depends on location control; if this precondition is not met, another spatial term is used rather than a modification of *in*, reducing the number of available contrast sets. This may be one reason why fine-grained topological distinctions such as those defined in the RCC-8 calculus (Randell et al. 1992) are seldom relevant for linguistic interaction. Furthermore, in contrast to spatial directional terms like *in front of* and *behind*, the corresponding temporal terms *before* and *after* do not depend on (temporal) regions of applicability (cf. Tenbrink 2007). There is no possibility of digressing from the focal axis in time, because time is conceived of as linear. However, both types of relational terms are associated with proximity. This can be made explicit by specifying the particular position on the axis, by using expressions like *directly* that may indicate a close temporal relationship (as in *directly before Christmas*) as well as a close spatial relationship (as in *directly in front of you*). But only in the spatial domain is it possible to also denote a position directly on an axis, rather than a digression from it, as in *directly in front of you* as opposed to *in front and a little bit to the right of you*. Thus, the fact that spatial directional terms refer to three dimensions as opposed to one-dimensional time leads to a far broader implicit contrast set for these terms than for their temporal counterparts.

Discussion

The choice and interpretation of lexical items in a linguistic description relates to alternative descriptions that might have occurred in this context. Successful communication about spatiotemporal relationships then involves establishing the correspondence between a description and a situation in relation to other available descriptions, disambiguating referents of descriptions, and refining and coarsening descriptions flexibly according to the current discourse task. Redundancy and overlap of meaning are required as they enable the dynamic use of lexical items as well as transfer of meaning to other domains.

Our account provides an overview of the various influences of context on the contrast sets available for a description. These are by no means restricted to spatiotemporal terms; rather, we have exemplified a range of generally active phenomena by taking a closer look at a subset of lexical items which are fundamental to human cognition. Similar conceptual structures such as those represented by spatiotemporal terms can be found throughout language, partly directly transferred via analogic structure mapping (Gentner 1983).

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