Spatial Cognition in Natural-Language Narratives

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Abstract

Any system designed to model or simulate narrative intelligence will have to take into account how stories encode mental representations of emergent spatial relationships between items in narrated worlds. Intelligent agents, for example, need to be able to use sequences of referring expressions as cues for making inferences about agents, places, and objects and about the dynamic relations between them. Based on a corpus of seventeen North Carolina ghost stories, this paper argues that studying processes of spatial reference in natural-language narratives can yield important insights into some of the principles and parameters of narrative intelligence.

Data and Methodology

My paper derives from work done as part of two research initiatives at North Carolina State University: the Liquid Narrative Group spearheaded by Michael Young, and the North Carolina Language and Life Project, which is directed by the sociolinguist Walt Wolfram, and which studies linguistic, ethnographic, and interactional dimensions of speech communities across the state of North Carolina. Thus, in general terms, my work draws on linguistics (especially discourse analysis), cognitive science, and the interdisciplinary field of narratology in an effort to accomplish two broad goals. The first is to help illuminate the nature and scope of narrative itself; the second is to highlight how theoretical approaches to narrative have important applications for those working on computational models for human reasoning and cognition, as well as those in the field of human-computer interaction.[1] More specifically, my paper for the Symposium on Narrative Intelligence reports results from an ongoing research project on the role of spatial cognition in narrative processing. Arguably, any system designed to model or simulate narrative intelligence will have to take into account how stories encode mental representations not just of things-in-space, but also of emergent spatial relationships between these located things. Intelligent agents, for example, need to be able to use sequences of referring expressions as cues for making inferences about agents, places, and objects and about the dynamic relations between them. Hence, studying spatial reference in natural-language narratives can yield important insights into some of the principles and parameters of narrative intelligence. Based on a corpus of seventeen ghost stories told by residents of Robeson and Graham Counties, North Carolina, during sociolinguistic interviews designed to gather information about their dialects, my paper focuses on how tales of the supernatural provide an ideal laboratory for cross-disciplinary investigation of referential processes in narrative.

Like other storytellers, narrators of ghost stories have to furnish cues that enable their listeners to identify referents over time--to track agents and objects as they move from one state of affairs to the next in the storyworld (Emmott 1997). More than this, however, tellers of supernatural tales must also help their listeners interpret otherwise inexplicable events as paranormal actions. Such actions are performed by agents that can sometimes be quite difficult to detect, describe, and monitor. The challenge of tracking the movements of ghostly agents through space is no less demanding than establishing reference to such agents to begin with. Thus, not just quaint tales about rural areas with a haunted past, the stories in my corpus provide an important test-case for studying how narratives enable "cognitive mapping" (Downs and Stea 1977; Gould and White 1986; Ostroff 1995), i.e., the process by which things and events are mentally modeled as being located somewhere in the world.

Note that in much early research on narrative, if space was discussed at all it was used negatively, to mark off setting from story, orientation from complicating action (Labov 1972; Labov and Waletzky 1967), description from narration proper (Genette 1982).[2] The tendency to make temporality the hallmark of narrative, and space a more or less optional accompaniment, is evident in some of the early documents of the narratological tradition (e.g., Barthes 1977). Already in the late 1960s and the 1970s, however, Greimas and his associates (Greimas 1988; Greimas and Courtés 1983) began developing an

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[1] See Herman (1997), (1999a), (1999b), forthcoming(a), and forthcoming(b) for examples of previous and ongoing work. A transcription of most of the ghost stories in the narrative corpus discussed in this paper can be found in Herman, forthcoming(a).

[2] Zoran (1984) usefully draws together, and extends, narratological approaches to space in narrative.

approach that anticipated more recent work on language and narrative--work suggesting that spatial reference in fact plays a crucial, not a weak or derivative, role in stories. Prefiguring later work based on the concept of *deictic shift* (Duchan et al. 1995), Greimas and Courtés (1983) argued that narratives, among other types of discourse, are made possible by what they called spatiotemporal *disengagement*, i.e. a "split which creates, on the one hand, the subject, the place, and the time of the enunciation and, on the other, the...spatial and temporal representation of the utterance" (88).[3] Greimas and Courtés (1983: 180-81) also discussed what they called spatial localization in narrative, whereby storytellers distribute storyworlds into spaces that they represent as being inhabited by particular characters. Building on Meletinsky's (1970) distinction between familiar and alien spaces in Russian folktales, Greimas (1988: 76-100) created a taxonomy that distinguished between topical (or relatively proximal) and heterotopical (or relatively distal) narrative spaces, further subdividing topical space into utopian and paratopical spaces that he associated with action and setting, respectively.

Analogously, studying ways in which spatial localization is accomplished in oral narratives, my paper uses the locution *narrative domains* to emphasize that stories should be viewed not just as temporally-structured communicative acts, but also as sets of verbal or visual cues anchored in mental models (Johnson-Laird 1983) having a particular spatial structure. More exactly, stories encode mental representations according to which the world being told about has a particular spatial structure. Thus, although it is true that narratives display a double temporality, being sequentially organized accounts of sequences of events (Chatman 1990), stories can also be thought of as spatializing storyworlds into evolving configurations of agents, objects, and places. Recent work in narrative theory incorporating discourse-analytic and cognitive-scientific ideas confirms that grasping the *when*, *what*, *who*, and *where* of events being recounted is a matter of actively building and updating mental representations of storyworlds. Emmott (1997), for example, has developed the notion of *contextual frames* to discuss how readers of written narratives supplement text-based or propositional information with situation-based information (cf. Speelman and Kirsner 1990). When people read they do not automatically and iteratively

assign referents to third-person pronouns, for instance, by attaching them to entities previously mentioned in the discourse. Rather, reference assignment is made possible when narrative texts cue readers to activate contextual frames, i.e., knowledge representations that store specific configurations of characters located at specific spacetime coordinates in the storyworld. Referring expressions thus evoke not just fictional individuals but whole contextual frames, and discourse anaphora, anchored not so much in particular entities as in the spatiotemporal contexts of those entities, starts to reveal properties normally associated with deixis. More generally, Emmott's model, like Fludernik's (1996) emphasis on *viewing* and *experiencing* as basic cognitive parameters for telling and interpreting stories, suggests that framing representations of the *where* in a story is a major dimension of narrative processing, not a matter of filtering out descriptive detail to form interpretations of core narrative elements (e.g. who did what to whom and why).

My paper surveys six key ideas growing out of such recent narrative-theoretical work and sketches their applications for the study of spatial cognition in oral narratives. The theories throw light on stories taken from my corpus, while conversely the stories reveal the importance of incorporating natural-language data into research on language, narrative, and space. The final part of my paper focuses in on a single story, showing how the research tools I discuss can be used in concert to expose a very rich structure of spatial reference in narrative domains.

Spatial Reference and Cognition in a Narrative Corpus

Following are the six key ideas I use to study processes of spatial reference—and, by extension, spatial cognition—in the North Carolina ghost stories.

• The notion of *deictic shift*, whereby a storyteller prompts his or her interlocutors to relocate from the here and now of the current interaction to the alternative spacetime coordinates of the storyworld (i..e., the world being told about) (Gerrig 1993; Ryan 1991; Talmy 1995; Yuhan and Shapiro 1995; Zubin and Hewitt 1995);

• the distinction between *figure* and *ground*, alternatively described as *located object* versus *reference object* (Frawley 1992; Herskovits 1986; Landau and Jackendoff 1993: 217-12);

• the notions of *regions*, *landmarks*, and *paths*, as developed by Landau and Jackendoff (1993);

• the distinction between *topological* (or inherent) and *projective* (or viewer-relative) *locations* (Frawley 1992; Hanks 1990: 293-351; Levinson 1996);

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[3] Well before Greimas developed the notion of disengagement, Bühler (1965) had discussed the phenomenon of *Deixis am Phantasma*, whereby entities not present in the immediate deictic field of a current communicative act are treated as if they were, as when a speaker makes an apostrophe to an absent (or even dead) interlocutor.

• the deictic functions of *motion verbs* located on a semantic continuum whose poles, in English, are *come* and *go* (Brown 1995: 108-24; 188-91; Landau and Jackendoff 1993; Zubin and Hewitt 1995);

• and the distinction between the *what* and *where* systems of spatial cognition, proposed by Landau and Jackendoff (1993; see also Landau 1994, 1996). The what system is postulated to be the richer of the two; it is encoded via many thousands of count nouns, while the where system concerns chiefly directions of movement and objects' axial structure, being encoded mainly via prepositions and spatial adverbs.

After showing how a number of the stories in my corpus rely on (and linguistically encode) these mechanisms of spatial cognition, I provide an integrative analysis of one narrative whose teller resorts to several of the mechanisms in combination. For instance, at the opening of her tale the storyteller alternates between *was* and *is*, shifting from the deictic center of past events to the center of the present act of storytelling, then shifting back again with the nonstandard past tense form *I seen him*. Accomplished morphosyntactically, these cues enable the narrator's interlocutors to transpose spatial parameters of the current interaction back onto the past, when the events at issue happened. In particular, the teller refers to the two double windows of her bedroom, both gesturally and linguistically, with an emphatically loud production of the spatial deictic *there*. Thus marked as salient, the windows serve as a reference object for the narrator's bedroom in two different time-frames. By using the windows to help her present interlocutors grasp the spatial layout of her house, the storyteller reduces the processing effort required for cognitive mapping of past events.

Likewise, the narrator uses motion verbs to indicate both her perspective on events and the trace of her dead brother's movements through regions located by way of two landmarks or reference objects, her bedroom windows and the little sidewalk that leads up to them. The ghost *comes* to the window; he then *turns* or *goes* away from it; then, in an effort to see him *go/turn* down the sidewalk, the storyteller *gets up off of* her bed—using, in this last utterance, a compound form that functions as a morphologically complex variant of *go*. This sequence of verbs not only charts the comings and goings of the ghost, but also establishes projective locations of the ghost vis-à-vis the storyteller as observer. Indeed, the point of this story depends in large part on the path taken by the ghost toward and then away from the region from which the narrator looks on, as well as the path taken by the teller herself as she gets out of bed and moves toward the sidewalk region in attempts to keep on observing the departing ghost. By encoding paths taken through these projectively located regions, the story reveals that the spaces of life and death ultimately cannot intersect--even though the narrator's dead brother presses close to the boundary of the living. Furthermore, by tracing movements of entities on paths towards and away from a particular vantage-point, the narrator's account recruits a where system of the sort specified by Landau and Jackendoff (1993). The storyteller's heavy reliance on verbs of motion sets up a distal-proximal axis, with things successively moving closer or getting farther away from the vantage-point of her narration. The story thus models the where in a manner that preserves only very coarse geometric properties of the what. That is, in representing place, the narrative expresses mainly the axial structure of objects, and more specifically the direction in which they are pointed along the paths that lead to and away from the narrator's bedroom windows, hither and thither along the little sidewalk.

The analysis sketched here is of course far from being an exhaustive account of how spatial reference functions in the stories in my corpus—let alone in narrative as such. Yet the paper does, I believe, succeed in showing spatial reference to be not an optional or peripheral feature of stories but rather a core property that helps *constitute* narrative domains. My data reveal that telling a story necessitates modelling, and enabling others to model, an emergent constellation of spatially-related entities. In short, the narratives in my corpus build relationships between agents, objects, and places, thereby creating a rich blend of space and time, or what Bakhtin would characterize as a "chronotopic" structure (Bakhtin 1981; Zoran 1984). No wonder, then, that the word *narrative* itself derives from the Sanskrit word *jn~a:na,* meanin*g* "knowledge." It is not just that knowledge about space makes it possible to understand narratives; more than this, storytelling is a form of cognitive and communicative behavior in which, acting together, humans spatialize and thereby comprehend the world. To put this same point another way, narrative allows people to build spaces in which to think, act, and talk.

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