

Domain Structure, Rhetorical Structure, and Text Structure

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Introduction

It is generally agreed that text has structure (at least, coherent text does). Therefore, an understanding and appreciation of text structure must play some role in building computational systems that are capable of using text as people do. What is less clear is what are necessary and sufficient sources of structure for a text-using system, and further, what such a system needs to know about and do with these structures in the process of using text. By using text, I mean understanding it or producing it; speaking it, writing it, or thinking about it. In this paper, I present a case for the importance of domain structure in structuring text, and discuss the role of rhetorical structure and intentionality.

Intentionality and Structure

The purpose of this workshop is to consider traditional and new approaches to identifying and representing structure for text. The workshop title suggests that intentionality, or rather, our representation of it, has a critical role in text structure. I have no intention of arguing against the existence of intentions; however, I believe this emphasis on intentions in accounting for text structure is misdirected, for two reasons.

The first reason is similar to one that I present in the next section as an argument against rhetorical relations, namely, that a representation of intentional structure has no explanatory power in describing at least some texts. For instance, a speaker's intentions in answering the request, "Please describe for me the layout of this house," are not likely to be more complex than to provide a coherent answer. Knowing about the intention to provide a coherent answer, however, reveals nothing about what actually makes the resulting text coherent. (Vander Linden, this volume, makes a similar point with respect to written instructional text.)

The second reason is that intentions are typically construed to be entities that are abstract, domain independent, and so forth, divorced from the particulars of how they are expressed. In all my work in understanding how text is put together, I have yet to find a use for intentions so construed. Rather, I suspect that intentionality is so completely diffused throughout the structure

of a text that to consider it as a separate phenomenon is not instructive. Exploring this issue further is beyond the scope of this position paper; I refer readers interested in a fresh perspective on intentionality to Batali (1993).

Structure: Domain, Rhetorical, and Text

In this paper, I suggest that, irrespective of their relation to intentions, rhetorical relations, as they are typically construed¹ (e.g., in Mann and Thompson's Rhetorical Structure Theory (RST) (1987)),

1. are not sufficient sources of structure for a text-using system; and
2. are not necessary for at least some uses of text.

Instead, I take the position that,

1. in order not to be vacuous, rhetorical structure must be grounded in the domain of discourse, and thus cognizant of the structure of that domain; and
2. in some types of text the structure of the domain is a sufficient source for the structure of the text, and rhetorical relations are superfluous.

I will briefly sketch both parts of this position. They are discussed in more detail in Sibun (1992, 1991), which also describe a working text generation system built according to these principles.

To see what is missing from an account of text structure that is solely in terms of rhetorical structure, let us consider one of the best known and most thoroughly worked out theories, Mann and Thompson's RST. Seven of the 23 RST relations are *presentational* relations, while most (16) are *subject matter* relations, such as NON-VOLITIONAL CAUSE and SEQUENCE. Out of combinations of any of these relations can be built a representation of the structure of a text. However, while this rhetorical structure may be a domain independent way of representing how domain knowledge may be variously ordered, the question remains of what the domain structure is that is being reordered domain independently. In other words, since we assume that rhetorical relations are not assigned arbitrarily between clauses, there must be something about the domain itself that constrains the *subject matter* relations.

Consider, for example, the text produced in response to a request to describe a particular house; suppose the house is a large one with a livingroom and a sunporch in the northeast corner and a diningroom and a kitchen in the southwest corner. If the text contains these two clauses (the second is reduced),

there's a sunporch
then a livingroom

¹See Sidner, this volume, for a discussion of the semantic drift of the term "rhetorical" from its use with respect to the discipline of rhetoric to its current use in computational linguistics.

then the relation SEQUENCE is licensed because the rooms are physically proximate (physical proximity is a relation in spatial domains such as houses). However, if the second clause mentions the diningroom on the other side of the house, no SEQUENCE may be involved, though at the rhetorical structure level, it is unclear what other relation could possibly be assigned. Indeed, the text may prove to be incoherent, but it is incoherent precisely in virtue of the relations in the domain, not in virtue of the SEQUENCE relations in the rhetorical structure. (See Sibun (1992) and Kittredge *et al.* (1991) for further examples of the need for taking domain structure into account.)

I have shown that domain structure is crucial to ascertaining rhetorical structure. Any system of rhetorical relations, therefore, can only lay claim to sufficiently accounting for text structure if it is grounded in any domain of discourse to which it is applied, and it knows about how the domain structure relates to the rhetorical structure. (Rambow (1990) calls knowledge about this relationship *domain communication knowledge*.)

If rhetorical structure is not sufficient for accounting for domain structure, a logical question to ask is whether it is necessary. I am certain that it *is* necessary—some of the time. However, some of the time rhetorical structure does not appear to contribute anything to the structure of a text. This can be proved by demonstration: Salix (Sibun 1991, 1992) can generate multiclausal coherent texts in which the sole source of text structure is domain structure. Salix has generated domain-structured texts in domains of houses, families, text style, and airports.

One might be tempted to argue that it is important that rhetorical structure be available for the extent of a text. Thus, for example, a system generating a domain-structured text would maintain a rhetorical structure composed of a series of SEQUENCE relations. This rhetorical structure clearly doesn't shed any light on the text structure, and it has no impact on the generator's decisions; indeed its validity depends directly on the domain structure, bringing us back to the discussion above.

Conclusion

Because, in the general case, we cannot count on rhetorical structure to be either necessary or sufficient to account for text structure, I believe that rhetorical structure should not be the cornerstone of a computational theory of text structure. Rather, I think a fresh perspective is needed, in which rhetorical structure, domain structure, intentional structure, conversational structure, grammatical structure, and so forth, are all seen to play a role, none of them privileged, in text structure. I think that if we take all of these sources of structure into account, and emphasize one or more of them as seems warranted for the job at hand, we will find our task becomes easier: rather than appealing to a single abstract theory in discussing all texts, we will be availing ourselves of a rich set of tools for understanding each text to the fullest.

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