

## Computational and Conversational Discourse: Burning Issues—An Interdisciplinary Account

Eduard H. Hovy and Donia R. Scott (editors)

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*Reviewed by*  
Andrew Kehler  
SRI International

The array of perspectives from which discourse processing is pursued can be mind-boggling to students of discourse, both new and experienced. We are bombarded with concepts from various arenas that require sorting out: topic and focus, given and new, cohesion and coherence; the list goes on. Many questions loom for the computational linguistics (CL) researcher. What do notions such as topic and focus and given and new have to say about how discourses are interpreted, as modeled by formal approaches to coherence resolution? More generally, do works from traditionally functional perspectives contain deep insights, obscured by the lack of formal tools necessary to make them concrete, or does the articulate yet complex prose in these works obscure a lack of methodological rigor in their analyses? Is it time to follow other subdisciplines within CL and eschew theoretical work in favor of purely empirical approaches, or would such a move be wildly premature? *Computational and Conversational Discourse*, an outgrowth of a workshop entitled "Burning Issues in Discourse" held in April 1993 in Maratea, Italy, captures a snapshot of current discourse studies at the breadth necessary to begin addressing these questions.

### 1. The Contributions

The volume consists of seven papers on discourse as approached from four perspectives (sociology, linguistics, computational linguistics, and empirical), all authored by prominent researchers who are leading, and in many cases pioneering, contributors to their respective disciplines. As one proceeds, the papers become narrower in their focus but more precise in their descriptive notation, with the most noticeable gap occurring between the first four papers, which pursue primarily functional analyses, and the final three, which are computational in nature and more formal.

The first paper, "Issues of relevance for discourse analysis: Contingency in action, interaction, and co-participant context" by Emanuel A. Schegloff, is the sole contribution from the perspective of sociology. Schegloff, working within conversation analysis, argues for the importance of considering the actions performed and accomplishments made by utterances in a conversation, as opposed to their information content and truth.<sup>1</sup> He performs a line-by-line analysis of several examples of naturally occurring

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<sup>1</sup> See Hirst (1991) for a viewpoint on the relevance of conversation analysis to CL.

dialogue, illustrating the role played by each utterance (and in one case, the lack of an utterance by a recipient who has been given an opening to contribute one) in the developing construction of the discourse.

The next three contributions are from the perspective of linguistics, specifically functional linguistics. James R. Martin's paper, entitled "Types of structure: Deconstructing notions of constituency in clause and text," argues against a constituency representation for discourse, that is, that "a text is not a tree." Interestingly, and perhaps ironically for CL researchers, he pursues his argument by drawing an analogy with clause structure, here following the Hallidayan use of both constituency and nonconstituency representations for the latter and suggesting that constituency representations cannot capture the principles responsible for constructing textual meaning. The second contribution, entitled "Interaction and syntax in the structure of conversational discourse: Collaboration, overlap, and syntactic dissociation" by Tsuyoshi Ono and Sandra A. Thompson, argues that syntax is intimately involved in the interactional organization of conversational discourse. Examples are cited in which clauses, and in one case an unstated proposition, are constructed interactively by multiple participants, leading to a "dynamic" view of syntax. The final contribution, "The information structure of the sentence and the coherence of discourse" by Eva Hajičová, argues for the influence of the topic-focus articulation (TFA) of sentences on discourse interpretation. After giving a brief summary of TFA and related concepts within the Prague school of functional linguistic description, Hajičová suggests ways in which TFA correlates with changes in the degree of salience of possible antecedents for anaphoric expressions, illustrating these on a modified article from *Time* magazine.

There are two papers representing perspectives from computational linguistics, both addressing issues in discourse coherence recognition. The first paper, "Discourse coherence and segmentation" by Kathleen Dahlgren, argues that surface indicators such as cue phrases and shifts in paragraph structure, tense, and focus are insufficient for recovering discourse structure, and that instead this structure results from recognizing coherence relations explained by "naive theories of causal and other structure in the world." Dahlgren progressively develops a theory of coherence, in one case imposing a shallow notion of discourse structure to maintain a presumed correlation with locality constraints on pronoun resolution. The second paper, "On the relation between the informational and intentional perspectives on discourse" by Jerry R. Hobbs, is a contribution to the ongoing debate between the so-called intentional and informational approaches to coherence (Moore and Pollack 1992). Hobbs provides an analysis of a task-oriented dialogue using the "interpretation as abduction" framework (Hobbs et al. 1993), in which the establishment of informational coherence is seen as a subpart of the establishment of intentional coherence. The introduction contains an eloquent defense of the informational approach for those interested in this debate.

The final paper, "Empirical analysis of three dimensions of spoken discourse: Segmentation, coherence, and linguistic devices," by Rebecca J. Passonneau and Diane J. Litman (henceforth P&L), is the sole contribution from the empirical perspective. P&L describe experiments in which naive subjects performed "flat" discourse segmentations on spoken narratives from the Pear Stories corpus (Chafe 1980), and compare several implementations for recognizing those boundaries that the subjects tended to agree upon. The procedures are not fully automatic, however, in that some of the indicators are hand-coded, including the identification of NPs (including pronouns and even empty pronouns, see their Figure 6), their antecedents, and other inferential relations.

## 2. The Collection

I found most of the papers to be as accessible and self-contained as can be expected, with the exception of Martin's paper, which will not be easily comprehended by anyone unfamiliar with Hallidayan linguistics. Despite their outgrowth from a common workshop, however, there is little evidence of cross-fertilization between the papers. Schegloff perhaps makes the best attempt to address researchers outside of his field, especially in an interesting postscript in which he responds to a referee coming from an experimental or computational standpoint. Responding to a request to graft his work into a more formal format, he invites CL researchers to "seriously pursu[e] [his field] in its own terms, trying to understand why researchers proceed as they do in this area," concluding that "successful convergence here is, after all, a long shot."

Despite the lack of cross-fertilization, there are places in which statements in one paper raise issues manifest in others, adding to the appeal of collocating these papers within the volume. For instance, in his postscript, Schegloff responds to the following comment from his referee:

My concern is that someone else could come along and offer a very different interpretation of a conversation. . . . If so, how would we know which interpretation to choose? Do we just rely on the intuitions of native conversationalists, or can we put this kind of hypothesis to a more stringent test? In short, I'd like to see the insights that he has gained about what seem to be regularities in how conversations are managed firmed up into much more specific statements that would be objectively testable. (p. 24)

Schegloff notes that he offers his analyses not as a native conversationalist but as an informed, technical analyst, and then responds:

Curiously, it is those experimentally inclined investigators who wish to put interactional materials before naive judges and treat their reactions seriously . . . who seem to me to wish to "just rely on the intuitions of native conversationalists." Indeed, I submit that the accounts offered above have been put "to a more stringent test," and have been "firmed up into much more specific statements that [have been] objectively test[ed]." (p. 26)

This response illustrates a tension that exists between P&L's empirical work and theoretical work on discourse structure. The flat segmentation used by P&L, in contrast to approaches positing full hierarchical tree structure (Grosz and Sidner 1986; Polanyi 1988), and in stark contrast to the papers by Martin, Dahlgren, and Hobbs, all of whom argue that even a (surface contiguous) tree structure is sometimes insufficient, is a concession to their choice to use naive subjects to mark the segment boundaries. As Schegloff might say, P&L put "materials before naive judges and treat[ed] their reactions seriously," a decision that could be questioned, especially when considering some of the examples P&L provide. For instance, to give an analogy with clause structure, would one be interested in predicting syntactic trees as drawn by subjects with no training in syntax, rather than, say, by initiated researchers striving for some degree of theory neutrality (cf. Marcus, Santorini, and Marcinkiewicz [1993, p. 321]), especially if the use of such subjects necessitated that they limit the depth of their trees to one?

Likewise, an interesting contrast occurs between P&L and Dahlgren's contribution. On one hand, without referencing P&L, Dahlgren argues that the types of indicators P&L use to recover discourse structure are highly inadequate. On the other hand,

without referencing Dahlgren, P&L address a potential concern with Dahlgren's approach:

... if segments are taken to be an independent construct [as opposed to definitional] that correlate directly with the focus of attention ... or the speaker's specific rhetorical purposes ... , the definition of segment must be formulated independently of the distribution of linguistic devices. (p. 167)

Dahlgren in fact does not formulate her notion of discourse structure independently, instead directly incorporating factors identified in two corpus studies (e.g., pronominal reference behavior) into her proposal. Dahlgren then concludes:

This theory *predicts* that change of discourse relation results in change of segment, one of the main findings in our Study 1. The approach proposed here *predicts* the availability of antecedents for anaphors by ... the constraints of the discourse segment structure. (p. 134, italics added)

In actuality, Dahlgren's definitions were based specifically on these very findings and thus cannot be said to "predict" them. This is what experimentalists would call testing on one's training data, an unfortunately common occurrence in linguistics.

### 3. Conclusions

Readers having suffered through this review thus far are undoubtedly ready to hear whether they should invest their money in purchasing the book, or alternatively whether to recommend it to their librarian and invest their (undoubtedly copious) free time reading it. The answers depend on what return one expects from the investment. To recommend it, the book offers a collection of representative papers from an impressively varied array of approaches to discourse, authored by an equally impressive set of researchers who have pioneered those very approaches. The book thus provides "one-stop shopping" for researchers looking for an up-to-date sampling of discourse research from a broad view. Also, each paper comes with an extensive bibliography suitable for pursuing the literature in any of these areas to greater depth.

I find the book to be a reasonable first step toward a more challenging goal that is nonetheless not reached here, that is, real progress in cross-fertilizing approaches to discourse, especially ones that span the implicit barrier between the functional and computational approaches. The reader who is already familiar with work in these disciplines, and now seeks answers to nagging questions regarding cross-fertilization, will not find them here. However, merely having these papers collocated, and the comparisons one makes when reading them together, might serve to inspire ideas that would not have otherwise come to mind.

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*Andrew Kehler* received his Ph.D. from Harvard University in 1995, and is currently a member of the Artificial Intelligence Center at SRI International. His work in discourse processing has addressed problems in ellipsis, anaphora, and coherence resolution. Kehler's address is: SRI International, 333 Ravenswood Avenue, EK272, Menlo Park, CA 94025, USA; e-mail: keehler@ai.sri.com