

**CS/ENGRI 172, Fall 2003: Computation, Information, and Intelligence**  
**11/12/03: Discourse Structure**

Examining some examples of realistic discourse, we can identify three phenomena which a model of discourse must be able to account for:

*Discourse Segments* [Example adapted from Sidner (1979).]

- (1) Wilbur is a fine scientist and a thoughtful guy.
- (2) He sent me a really interesting book by surface mail a while back.
- (3) It was mostly about “sideways” quarks,
- (4) which are completely bizarre —
- (5) they’ve led to the development of a weird new theory of counter-intuitionistic physics.
- (6′) Anyway, I finally got it while I was writing up my thesis.
- (6″) I finally got it while I was writing up my thesis.
- (7) They’ve been fundamental to understanding “new relativity”.

*Intentions* [Example from Grishman (1986), pp. 157.]

**A:** Do you know when the train to Boston leaves?

**B:** Yes.

**A:** I want to know when the train to Boston leaves.

**B:** I understand.

*Incoherence* [Example from Grosz and Sidner (1986), citing Polanyi and Scha, “forthcoming”.]

- (1) John came by and left the groceries.
- (2) Stop that you kids.
- (3) And I put them away after he left.

### **Grosz and Sidner Theory of Discourse Structure**

This theory, proposed by Barbara Grosz and Candace Sidner in “Attention, Intentions, and the Structure of Discourse” (*Computational Linguistics* 1986), posits three components of discourse structure:

1. *Linguistic Structure*: groupings of utterances into *discourse segments*. Each discourse segment corresponds to a *discourse segment purpose* (DSP), the intention that the speaker *wants* the other conversational participant(s) to recognize.
2. *Intentional Structure*: relations between DSPs, where there are two types of relations (given below), and the intentional structure defined by these relations can be represented by a partially-ordered tree. *Cue phrases* aid in the recognition of this structure.
  - *domination*: satisfaction of one DSP furthers another DSP;
  - *sat-precedence*: satisfaction of one DSP must precede the satisfaction of another DSP.
3. *Attentional Structure*: groupings of discourse entities into *focus spaces*, indicating a *salience ordering*. The focus spaces for active discourse segments contain the segment’s DSP and any currently active referents; active focus spaces are maintained on the *focus stack*.