Discourse: Grosz and Sidner (1986) model

- a theory of discourse structure
  - used to constrain a NLUS
  - determines what constitutes a coherent discourse
  - terminology: ICP (initating), OCP (other)
  - 3 main components
    - linguistic structure
      - structure of sequence of utterances
    - intentional structure
      - structure of intentions underlying discourse
    - attentional state
      - state of focus of attention (objects)

what's new:

- handles discourse phenomena like:
  - interruptions, referring expressions, cue words
- accounts for discourse coherence beyond rhetorical patterns, just selecting from fixed set
  - instead: small number of relations between intentions
- extension of speech act analysis of utterances
  - now at level of discourse

LINGUISTIC STRUCTURE

- aggregation of utterances into segments
  - examine segment's role in discourse
  - examine utterance's role within segment
  - note: non-consecutive utterances can be in same segment
- relation to linguistic expressions (cue phrases)
  - convey information about structure
  - discourse structure constrains interpretation of cues
  - some markers signal intentional structure or attentional state

how to determine the segmentation?

- partly due to intentional structure

- analyze discourse by determining goal structure; segmentation can then be drawn

- includes recognizing and interpreting cue words

Other Work on Segmentation

- Hobbs' classification of coherence relations
  - classes of coherence relations to satisfy types of goals: strong temporal, evaluation, linkage, expansion
    - S1 is an exemplification of S0 if p(A) can be inferred from S0 and p(a) from S1, where a is a member or subset of A
- Mann and Thomson: RST theory
  - broad classifaction of possible relations, absence of pragmatics

INTENTIONAL STRUCTURE

- start with discourse purpose DP and for each segment DSP: how each segment contributes to overall DP; one intention

- DSPs are intended to be recognized

- typical intentions

  * intend that some agent intend to perform some physical task

  * intend that some agent believe some fact

  * intend that some agent believe one fact supports another

  * intend that some agent intend to identify some object

  * intend that some agent know some property of an object

- relations between intentions
  - DOM (dominates)

    DSP2 DOM DSP1 if DPS1 "contributes to" DSP2
  - satisfaction-precedes
    - ordering is important
  - small number of structural relations to recognize is key

ATTENTIONAL STATE

- abstraction of focus of attention
- property of the discourse, not of participants
- objects, properties and relations that are salient
- dynamically changing
- modeled as set of focus spaces
- transition rules for adding, deleting spaces

- associate a focus space to each discourse segment
  - salient entities from utterance and related to utterance
  - DSs tied to FSs with a stack of FSs
- controls the analysis of discourse: referring expressions and how upcoming discourse can relate to current
- attentional, intentional, linguistic interact for full interpretation of discourse

PROCESSING ISSUES

- challenge: to sort these influences into a coherent algorithm for analyzing discourse

- determining intentional structure: cue words, utterance-level intentions, real world knowledge

- constraint satisfaction on partial information, constraining range of possibilities, for linguistic and attentional elements