Ordering Constraints on Discourse Relations
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Recent work investigates the ordering constraints discourse relations impose on texts. Wolf and Gibson (2003) generated GraphBank, a discourse-annotated corpus without a prior constraint to tree-structured annotations, showing that naive annotators generate representations containing multiple-parented nodes and relations with crossing arguments. Webber et al. (2003) hypothesize that discourse models’ relations should be divided into structural connectives which are limited to relating adjacent discourse segments, and discourse adverbials which are not.

This hypothesis cannot be tested using traditional discourse corpora which use Rhetorical Structure Theory (Mann and Thompson, 1988), as RST annotations are constrained to be tree-structured. GraphBank lacks this constraint, so it can be used to test the discourse ordering constraint hypothesis. We automatically divided GraphBank’s relations into classes based on Webber et al.’s: discourse anaphora, (DAs) and discourse predicates (DPs). DAs are relationships of coreference or association; for instance (1) shows an alternatives relation, and (2) an elaboration. DPs are relations with truth value beyond the truth of their arguments. For instance, in (3), an explanation, one could agree that Fido was sick but argue that his trouble with calculus has a different explanation. However, in (1), it would be unusual to agree that one could have an apple or have a pear, but not agree that these are alternatives.

The GraphBank relations classified as DPs showed more treelike structure than those classified as DAs. Relative to how likely DPs were to cross, DAs were 4.7 times more likely to cross DPs, and 21 times more likely to cross each other. For validation, we retagged three sets of GraphBank relations: benchmark and crossing examples of each relation, and incoherent unrelated examples. The benchmark and incoherent relations were retagged correctly 0.71 of the time, while the crossing DPs were retagged the same 0.22 of the time, suggesting that they were not good examples of the relations. This was partially due to GraphBank’s limitations. Since GraphBank lacks association and coreference, annotators used parallelism and example as proxies, generating false positives. Also, GraphBank lacks a distinction between Webber et al.’s anaphoric alternatives relation (1) and non-anaphoric contrast relation (2c). It initially appeared that contrast was a strong counterexample to Webber et al’s claim, but though semantically similar, alternatives and contrast are structurally different, and signalled using distinct lexical cues, and needed to be separated.

These results supports Webber et al.’s claim that a distinction must be made in accurate discourse representations between discourse predicates which are semantically powerful but structurally constrained and discourse anaphora which are less expressive but less structurally constrained.

Examples

(1) a. Do you want an apple?
   b. Otherwise you can have a pear.

(2) a. Babet was thin and learned.
   b. He was transparent but impenetrable.
   c. i. Daylight was visible through his bones,
      ii. but nothing through his eyes.

(3) a. Fido was sick all through spring term,
   b. so he has trouble with calculus.