

Discourse Structure and Discourse Interpretation

Author(s): Livia Polanyi

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Livia Polanyi
FX Palo Alto Laboratory

1 Introduction

In this paper, I present an informal account of discourse syntax and semantics under the *Linguistic Discourse Model (LDM)*. (Polanyi 1985, 1987, 1988, 1996; Polanyi and Scha 1984; Polanyi and van den Berg 1996; Scha and Polanyi 1988; Prust, Scha and van den Berg, 1991; van den Berg and Polanyi, 1999). The goal of analyzing discourse under the LDM is to assign a correct semantic interpretation to each semiotic gesture in a discourse – be it a word or phrase, a deictic gesture or significant head nod. A correct semantic interpretation allows us to characterize how speakers are able to recover personal, temporal and spatial references even in apparently disorderly discourse as well as to provide appropriate next utterances even while the conversation may seem to have wandered off course¹. To ground the discussion, we will consider Prince's 1988 account of Yiddish Expletive, *ES + Subject Postposing*. I will argue that Prince's analysis provides an excellent point of departure for exploring the nature of language use above the sentence. After presenting an overview of the LDM, we will consider a re-analysis of Prince's Yiddish data in the LDM framework. It will be shown how apparent counter examples to her account of Yiddish *es + Subject Postposing* fall out of our analysis.

2 Prince's treatment of Yiddish Expletive *ES + Subject Postposing*

Prince (1988: 176) presents an analysis of 1804 clauses from a corpus of Yiddish anecdotes, *Royte pomenantsen* (I Olavanger ed. 1947) "in which the subject is Postposed with a concomitant use of expletive ES". We use Prince's examples, shown in 1-3 below, to illustrate the phenomenon:

1. *es* is geshtorbn *a raykher goy*.
It is died a rich gentile
A rich gentile died.
2. *es* veln oyfahteyn *groyse khakhomin* *fun daytshland ...*
it will upstand big sages from Germany.
Great sages from Germany will stand up.
3. *es* geyt epes in vald *a yid*
it goes something in wood a Jew
Some Jew seems to be walking in the woods.

Prince argues that "Postposed subjects of ES-sentences indicate that they do not represent entities which have already been evoked in the discourse." (184) Her conclusion is well supported by the data given: out of 1804 examples of ES+Subject postposing, there are only 2 putative counterexamples to this generalization which both occur in the same story. These counterexamples bring into question the apparently unremarkable idea of what it means to be evoked in the discourse. Arriving at a general, independently motivated theory of what evoked in the discourse entails is the task of this paper.

2.1 Non-discourse initial Postposed subjects of ES sentences

In her 1988 article, Prince explains that the full NP *the horse and the wagon* occurs six times in the text of a single anecdote, *What my Father Did*². In two cases, the postposed subject in an ES sentence is not "discourse initial in the story" (Prince 1988:184).

Prince explains these apparent anomalies as follows:

*The second occurrence*³ [of the phrase in the text] is Postposed [and] is in an interior monologue of the hero – and since, as far as we know, he has not spoken about the horse and wagon recently it is discourse-initial in his private discussion with himself.

*The fourth occurrence*⁴ [of the phrase in the text] is [also] Postposed, but this time it is in his public announcement back in the inn, addressed to the guests, and in that speech-event it is discourse initial.

*Thus it seems that the generalization is maintained that Postposed subjects of ES-sentences may not represent entities already evoked in the discourse, with the unsurprising caveat that discourses have internal structure and may themselves include sub-discourses in each of which some discourse entity may be new.*⁵

Prince's analysis of how these cases differ from the norm is compelling. However, as stated, the explanation of the key data is ad hoc and unrelated to any more systematic linguistic theory. No explanation of what it means for a discourse to have internal structure is given. In the following section, I will present an overview of the Linguistic Discourse Model (LDM) and then will show how the LDM can account for Prince's data within a comprehensive theory of discourse structure.

3 An Overview of the *Linguistic Discourse Model*

The LDM is modeled as a discourse parser which operates on a discourse from left to right accepting elementary discourse structures as input and returning as output a structural description of the discourse and a (set of) discourse semantic representations.

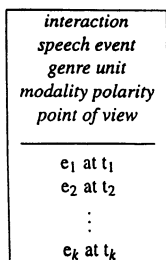
3.1 Basic Discourse Units

The elementary unit of discourse formation is the *Basic Discourse Unit (BDU)*. There are two types of BDU: the *elementary discourse constituent unit* or *e-dcu*, a semantically motivated semiotic structure that expresses propositional meaning, and the *discourse operator* that does not express content but structural and semantic relations among meaning units as well as pragmatic information linking the discourse to its utterance situation including greetings, vocatives and the speakers' attitude towards propositional information.

3.1.1 Elementary Discourse Constituent Units

Any semiotic gesture (a shrug of the shoulders in response to a question, deictic point, or shaking the head "yes" or "no") communicating an atomic predication is an encoding of an e-dcu. The e-dcu, when linguistically encoded, will have a syntactic and phonological realization. The e-dcu expresses an atomic predication: a single event or state of affairs in some semantic *world of discourse (WOD)*. The WOD is an intermediate representation between natural language expressions and model structures as in (DRT) and are no more mentally real than variables or generalized quantifiers. (It is important to point out that the elementary dcu is **not simply** a *sentence, clause, phrase, prosodic unit, discourse paragraph* [Longacre 1976], *discourse segment, turn at talk, or rhetorical/coherence relation*. [Hobbs 1976, Reichmann 1985, Mann and Thompson 1987]).

E-dcus are always indexed for situation of utterance (real or modeled interaction and speech event) and modal context: modality, specificity, evidentiality, point of view, etc. (Contexts may be underspecified.) These contexts identify the WOD in which the predication obtains. We depict a simple discourse world as shown in (4):



3.1.2 Complex DCUs

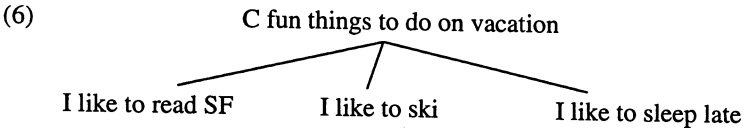
Complex discourse is formed by the recursive sequencing and embedding of dcus to dcus. There are three processes of discourse formation, *Coordination*, *Embedding* and *Binary Attachment*. These general processes as well as more specific discourse structure sub-types can be represented by rules of discourse grammar.⁶

Coordination (creating lists of various types)

Adding a next item to a list, giving a next episode of a story, beginning a new topic in a conversation when discussion of a previous topic has been concluded, or going on to a next expected activity in a speech event such as a church service can all be analyzed as continuing the development of an ongoing discourse activity. In the DPT such continuing activities are depicted as a sequence of coordinated constituents, i.e. as nonterminal *C* node immediately dominating arbitrarily many constituents that share a single type. LISTS, TOPIC CHAINS, and NARRATIVES are common sequential structures. To calculate the extension of the primary node label, all information held in common by daughter nodes is inherited up to the dominating node. (See Polanyi 1985, Prust, Scha and van den Berg 1994 for a discussion of these calculations.) Semantically, a new item on a list updates a representation of the listed structure with the information expressed.

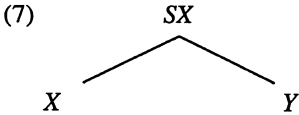
(5) *I like to read Sci-Fi. I like to ski and I like to sleep late.*

The structure of (5) can be characterized by the tree given in (6):



Embedding (Integrating elaborating and "interrupting" elements)

Discourse activities which interrupt the completion of other ongoing activities are treated in a structurally uniform manner. ELABORATIONS on a point just made, DIGRESSIONS to discuss something else, ASIDES, APPOSITIVES, sections of DIRECT DISCOURSE, or true INTERRUPTIONS are all treated as subordinated to activities which continue the development of an ongoing unit, be it a story, a proposal for a course of action, a lecture, or a move in speech event as well as SENTENTIAL SUBORDINATION (Matthiesson 1988, Thompson 1983), appositives, and parenthetical elements. In the general case, the subordinated constituent will be encoded as the right daughter *Y*. The subordinated (left) daughter is inherited up to the mother node⁷ in an elementary tree such as (7):

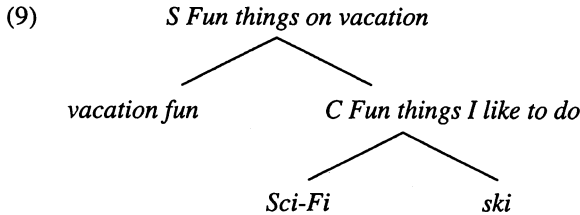


Perhaps less intuitively, the same structural description is appropriate for elaborations, where the right daughter gives more information about some aspect of the predication or entity encoded in the left daughter, as in the following example (8):

- (8) a. *I like to do fun things on vacation.*
 b. *I like to read Sci-Fi.*

Semantically, a representation of an elaboration is embedded within the representation of the units elaborated upon. A representation of an interruption, however, will not be incorporated within the representation of the structurally dominating constituent.

Should the discourse continue, (c.) *I like to ski*, this new dcu would be coordinated to *Y I like to read Sci-Fi* under a newly created *C* node interpreted as **Fun things I like to do** as in (9):

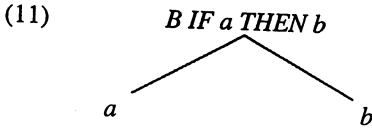


Binary attachment (Adjacency pairs, logical relations, rhetorical structures, sentential adjuncts)

Binary structures construct a dcu out of two dcus related logically (e.g. IF/THEN, THEN/IF, OR, THEREFORE), rhetorically, (e.g. SUM UP), or interactionally (e.g. QUESTION/ANSWER, WARRANT/RESPONSE, ERROR/REPAIR). Sentential adjuncts are related to the dominating sentential constituent in a MOD-Binary relationship.

- (10) a. *If John goes to the store*
 b. *he'll buy tomatoes*

In representing binary relations structurally an intrasentential binary node dominating both dcus in the first sentence is annotated with the complete binary structure as shown in (11):



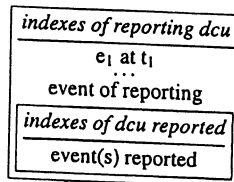
3.2 Discourse Parsing

Discourse segmentation is determined by semantic criteria and guided by syntax and intonation. A new dcu is started whenever phonological (i.e., pausal or prosodic) criteria indicate a break, whenever sentential syntactic criteria indicate a clause break (except for a lexically limited set of matrix verbs governing infinitival clauses), and whenever sentential semantics requires a change in any of the contexts (spatial, temporal, modal, etc.) that index the discourse worlds where the events (and, in general, states of affairs) are interpreted.

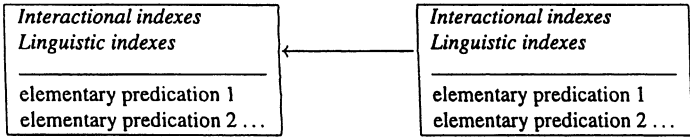
The structural description of any discourse is an Open Right Discourse Parse Tree (DPT). During discourse parsing a structural description is assigned to a discourse incrementally. Each incoming elementary dcu is attached to the developing DPT as the right daughter of an appropriate existing, or newly created, node along the Right Edge of the Tree. Once a node is no longer on the Tree's right edge it is no longer a candidate for new dcu attachment.

3.3 Discourse Semantic Representation

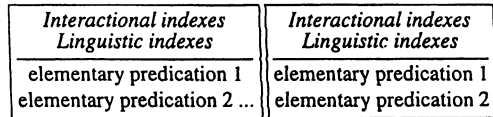
The attachment of the elementary dcu to the DPT's Right Edge is taken as an instruction to discourse semantics to create a new discourse representational structure to accommodate the propositional information asserted by the dcu or to increment or otherwise modify existing representations with the new information. We treat discourse worlds as purely technical devices of semantics, no more mentally real than variables or generalized quantifiers. For our purposes, discourse worlds are simply intermediate representations between natural language expressions and model structures, much as in DRT.⁸ Since discourse worlds are constructed by the discourse, truth relative to discourse worlds is automatic. Discourse worlds can be embedded in one another, as in the case of reported speech depicted in (12):



Elaboration and logical relations are indicated by arrows connecting representations or elements within representations.



Syntactic subordination of unrelated material, as in interruptions and digressions, does not give rise to semantic subordination, but rather to parallel (coordinated) discourse worlds as shown in (13):



The DPT is a record of the unfolding of the encoding event itself while the semantic representation encodes the states of affairs asserted to obtain in the WODs of the discourse interpretation. Thus, under the LDM, discourse syntactic and semantic structures need not be isomorphic: Discourse *syntax* is monotonic while Discourse *semantics* is non-monotonic. Some classes of Repair, for example, are instructions to remove information from a semantic representation under construction. In the DPT representing the syntactic representation of the discourse, there will be a record of the original dcus encoding the information to be repaired, the dcus encoding the Repair instruction and any subsequent dcus containing information to be substituted for the removed constituent. In the semantic representation, neither the original information nor the Repair instruction may appear.

4 Reanalysis of Prince (1988, 1993)

Let us begin to see how Prince's data is treated under the LDM by considering a shortened version of the Yiddish anecdote with glosses removed. The text given below has already been segmented according to LDM criteria.

What my father did.

(a) A guy once went by an inn. (b) He left his horse and wagon outside (c) and went alone into the inn. (d) Inside the inn, (e) he ordered a couple of eggs (f) or some chicken (g) and ate it. (h) Then he got up (i) to travel further. (j) He goes outside the inn. (k) He looks around. (l) There's no horse and no wagon. (m) He thought, (n) there was probably a thief among the people in the inn (o) that had stolen the horse and wagon. (p) He goes back into the inn (q) and shouts (r) "The horse and wagon should be returned". (s) The thief got scared. (t) He quickly went out (u) and brought back the horse and wagon.

This discourse consists of constituents of various types including: the List, Elaboration, SUM UP, Subordinate Clause, Operator/Sentence, Interruption, Direct Discourse, Reported Thought, IF/THEN, BECAUSE, ANTECEDENT / CONSEQUENT, and YIDDISH ANECDOTE and WRITTEN YIDDISH ANECDOTE. The WRITTEN YIDDISH ANECDOTE is a coordinate structure consisting of several coordinated constituents (as a first analysis and based on this one example).

YIDDISH ANECDOTE → (Opening), Orientation, Action, Question, Answer

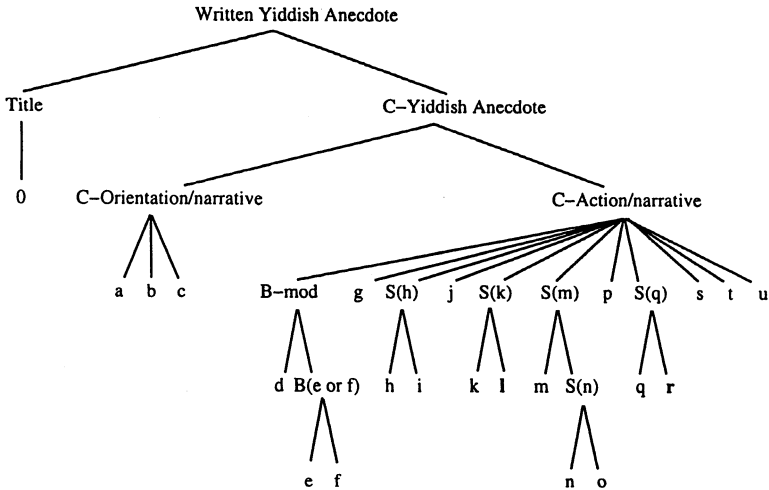
A WRITTEN ANECDOTE involves an Interaction between a Reader and a Modeled Writer in which an Interaction between a Modeled Narrator and Modeled Story Recipient takes place. The rule for WRITTEN YIDDISH ANECDOTE consists of the constituents of YIDDISH ANECDOTE plus an initial Title constituent:

WRITTEN YIDDISH ANECDOTE → Title, YIDDISH ANECDOTE.

4.1 LDM representations of *What my father did*

Following the rules of discourse segmentation and discourse syntax given above results in the Discourse Parse Tree for *What my Father Did* given in figure 1.⁹

An examination of the DPT for *What my Father Did* reveals its hierarchical structure. The events of the narrative mainline are represented as daughters of one coordinate ACTION node, while reported speech, thought and perception are shown as embedded constituents under S nodes. From this purely structural representation, however, it is not clear why the subjects in (l) and ® are not postposed. For an explanation of this phenomena we must look further to the semantic representation. In figure 2 below, we have prepared an informal representation of the semantics of this text.¹⁰



DPT for *What my father did.*

4.2 Evoked in which discourse?

As you will recall, LDM analysis of discourse requires that each BDU be tagged for a number of context variables. If we now examine the semantic representation for this text constructed following the LDM, it is clear that a *horse and wagon* is evoked within the scope of three separate interactional contexts: Interaction 1 involving a Modeled Narrator and a Modeled Story Recipient, Interaction 2 in which the participant is set is the Guy who acts as both enunciator of perception and receiver of enunciation, and Interaction 3 in which the Guy interacts with the crowd at the Inn. These three dcus correspond to dcus marked (b), (l) and (r). These are the first mention of *horse and wagon* in the Yiddish anecdote we have been examining and the two putative counterexamples to Prince's generalization.

Since the LDM requires tagging of each dcu for Interactional Context as well as for a host of other context types, our analysis provides the machinery to re-phrase Prince's theory of Yiddish expletive *es* + Subject Postposing without extending the model at all. The analysis of this under the LDM specifies that any entity mentioned initially in any Interaction Context will be marked in Yiddish as a first mention.

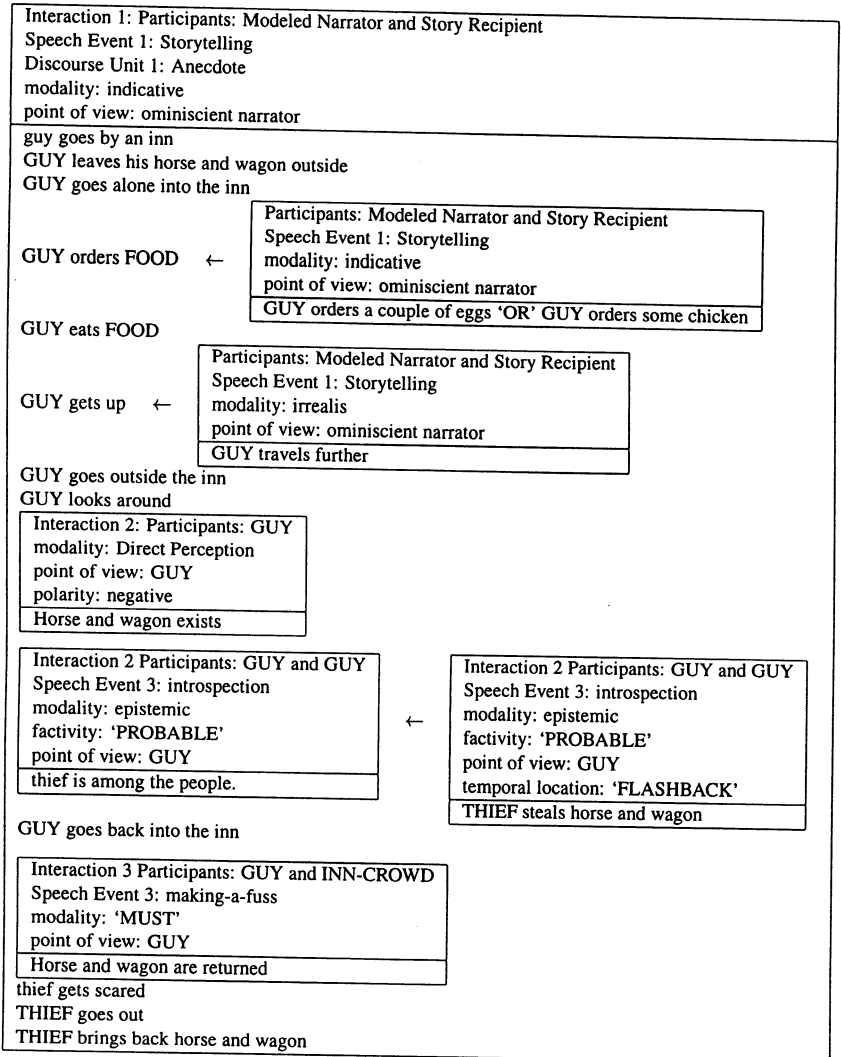


Figure 2: Informal semantic representation of *What my father did*

5 Conclusion

There are a number of important issues in discourse understanding which require an understanding of discourse structure, most importantly issues of anaphora resolution and reference tracking. In other published work, there have been accounts given of how the LDM framework described briefly here contributes to our developing understanding of these phenomena. (See Polanyi 1987; Prüst, Scha and van den Berg 1991; Polanyi and van den Berg 1996; van den Berg 1996, 1999.)

Notes

- ¹ How a discourse presents as "coherent" falls out of our semantic account but does not motivate the analysis.
- ² The translated shortened form of the anecdote is in Section 4 below.
- ³ *es iz nito der vogn un nit dos ferdl*
It is not here the wagon and not the horse
There's no **horse and no wagon**
- ⁴ *es zol teykef Vern der vogn mith ferdl*
It shall immediately become the wagon with the horse.
The horse and wagon must come back immediately
- ⁵ Emphasis added.
- ⁶ See Polanyi and Scha 1984, Scha and Polanyi 1988, and Prüst, Scha and van den Berg 1994 for discussions and examples of discourse grammar rules.
- ⁷ This constraint is relaxed in sentential subordination, where the normal order of embedding can be reversed.
- ⁸ In this informal account, none of the complex logics needed to express discourse semantic relations are discussed. See Prüst, Scha and van den Berg 1994; van den Berg and Polanyi 1995, 1999; van den Berg 1995 for more formal discussions.
- ⁹ For the sake of simplicity the terminal nodes are labeled only with the letter corresponding to the e-dcu in the segmented text; non-terminals are labeled only with C, S, or B and the simplest indication of semantic extension. Full node labels are much more extensive and allow for the computation on the non-terminal nodes necessary to express recursive dcu formation.
- ¹⁰ In order to make the diagram a bit more easily understood, only particularly relevant contexts are identified and after dcu l the contexts which hold for the entire are not repeated.

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