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Assertions from Discourse Structure

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20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

This paper characterizes relational propositions and presents a theory of discourse structure to explain them. In this Rhetorical Structure Theory (RST), relational propositions arise in direct correspondence to particular elements of the structure of a discourse. In addition to explaining relational propostions, RST can be used to explain other text characteristics as well, and it provides a way to address a wide range of discourse phenomena. We present RST progressively during analysis of a two-paragraph political advocacy text that involves substructures for informing, giving evidence, conceding, requesting an action, justifying a presention, and asserting conditionally.

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Introduction

As part of an ongoing study of discourse structure of natural texts, we have identified a particular class of propositions that affect the hearer's perception of the coherence and communicated content of texts. As an example, if the text (spoken in a suitable situation) is:

"I'm hungry. Let's go to the Fuji Gardens."

then the most natural interpretation is that the Fuji Gardens is a restaurant at which the speaker would like to eat with the hearer. The text is heard as exhibiting a problem-and-solution structure. Consequently, we can say that there is a proposition which says that there is a "solutionhood" relation between the two sentences. In this case, going to the Fuji Gardens (partially) solves the hunger problem.

The solutionhood construct is one type of *relational propositions*. Note that the proposition about solutionhood is not stated explicitly in the text.

Although phenomena resembling relational propositions have been recognized, there is no widely accepted explanation of how they arise from text. This paper characterizes relational propositions and presents a theory of discourse structure to explain them. In this Rhetorical Structure Theory (RST), relational propositions arise in direct correspondence to particular elements of the structure of a discourse.

We present Rhetorical Structure Theory progressively during analysis of a published, two-paragraph political advocacy text. The text involves substructures for informing, giving evidence, conceding, requesting an action, justifying a presentation, asserting conditionally, and others.

The two elements that form the basis for this paper, relational propositions and Rhetorical Structure Theory, have both been described in more detail elsewhere. The explanatory relation between them, however, has not [Mann & Thompson 83, Mann 84].

[Mann & Thompson 83] examines various other theoretical constructs, including implicature, presupposition and indirect speech acts, to see whether they account for the textual properties of relational propositions. It concludes that these constructs do not account for them. The paper also discusses relationships between relational propositions and the work of Grimes, Hobbs, van Dijk, Martin, Longacre, Beekman and Callow, and it includes analyses of several texts.

1 The Phenomenon of Relational Propositions

The Fuji Gardens statement and the solutionhood relation have already illustrated that relational propositions need not be signalled explicitly in order to be recognized.[1] Extending the example, we now describe properties relational propositions hold more generally, giving special attention to those properties that can be accounted for by Rhetorical Structure Theory.

1.1 Relational Propositions Assert

In our informal presentations of relational propositions, virtually everyone recognizes that texts such as the political letter analyzed in this paper convey the particular relational propositions that we attribute to them, even though it does not represent them explicitly. If the text author were to deny a particular relational proposition, most readers would be surprised--and puzzled about the status of the part of the text containing that proposition.

This general consensus testifies that the relational proposition is conveyed. Further evidence lies in the apparent redundancy or somewhat bizarre markedness that occurs when the relational proposition is asserted explicitly by adding a clause to the text:

"I'm hungry. Let's go to Fuji Gardens. Our going to Fuji Gardens would contribute significantly to solving the problem of my hunger."

1.2 Relational Propositions are Coherence Producing

One way to demonstrate that a relational proposition is coherence-producing is to insert a denial of the relational proposition into the text. Doing so makes some portion of the text a non-sequitur:

"I'm hungry. Let's go to the Fuji Gardens. Of course, going to the Fuji Gardens won't do anything about my hunger."

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[1]We use constructed examples in this section only, for expository reasons. RST is a theory of natural text; it was developed entirely on natural texts, such as the political advocacy text analyzed below.

The second sentence above has become a non-sequitur, and as a result the text as a whole is incoherent. Relational propositions are *always* coherence-producing in this way. We will see later that this is a consequence predictable from RST, particularly from the structural forms that RST posits. Also, relational propositions are *always* present in coherent multisentence texts.

1.3 Other Kinds of Relational Propositions

The list below names several kinds of relational propositions besides solutionhood, and gives an example of an asserted, coherence-producing proposition for each. These are drawn form the larger collection of [Mann & Thompson 83]; we believe that still more kinds of relational propositions could be discovered or perhaps created.[2]

EVIDENCE: They're having a party again next door. I couldn't find a parking space.

ELABORATION: I love to collect classic automobiles. My favorite car is my 1899 Duryea.

MOTIVATION: Take Bufferin. The buffering component prevents excess stomach acid.

THESIS/ANTITHESIS:Players want the referee to balance a bad call benefiting one team with a bad call benefiting the other. As a referee, I just want to call each play as I see it.

CONCESSION: I know you have great credentials. I'm looking for someone with great experience.

CONDITION: Give her a subscription to *Science* magazine. She'll be in seventh heaven.

REASON: I'm going to the corner. We're all out of milk.

JUSTIFICATION: Let me make one thing perfectly clear. I am not a crook.

We desire a theory that will answer two questions about relational propositions:

1. What relational propositions are possible?

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[2]We have abundant natural correlates for these constructed examples. They have been designed to illustrate the fact that the relations and relational propositions are identifiable without any explicit signalling, such as a clause, conjunction, or lexical selection.

2. What relational propositions does a particular text assert?

The answers come from studying discourse.

2 Rhetorical Structure Theory

RST has not been developed simply to account for relational propositions; it arose from a much broader desire to understand text and communication and to learn how texts may be created. We identified and began studying relational propositions only after RST had largely assumed its present shape.

We wanted a theory of text organization--a way to describe what kinds of parts a text can have, how they can be arranged, and how parts can be connected to form a whole text. We especially valued the following attributes.

1. **Comprehensiveness:** The theory should apply to many kinds of text.

2. **Functionality:** The theory should be informative in terms of how text achieves its effects for the writer.

3. **Scale insensitivity:** The theory should apply to a wide range of sizes of text and should be capable of describing all of the various sized units of text organization that occur in a large text.

4. **Definiteness:** The theory should lend itself to formalization and computer programming;

5. **Constructive potential:** The theory should be usable in text construction as well as text description.

We developed this theory primarily in response to small written texts, although it has also been applied to larger texts. We have constructed RST descriptions for a variety of texts, including:

- Administrative memos
- Personal letters
- Advertisements
- Editorial letters in magazines
- Complete *Scientific American* articles
- Newspaper articles
- Public notices in magazines
- Research technical reports
- Travel brochures
- Cookbook recipes

To introduce the theory, let us consider the analysis of a text that appeared in a political newsletter, The Insider, Vol. 2.1, July 1982.[3] The Insider is the California Common Cause state newsletter. This text was the "con" part of a "pro" and "con" pair of letters on the issue of California Common Cause's endorsement of the nuclear freeze initiative, which was then on the California state ballot.

The text has been reformatted, numbered, and divided the text into units. Units are roughly equivalent to clauses, except that that relative clauses and complement clauses are considered to be part of the unit in which their governing item appears, rather than as independent units. As long as the whole text is analyzed, the size of the minimal units can vary without affecting the larger analysis.

1. I don't believe that endorsing the Nuclear Freeze Initiative is the right step for California CC.

2. Tempting as it may be,

3. we shouldn't embrace every popular issue that comes along.

4. When we do so

5. we use precious, limited resources where other players with superior resources are already doing an adequate job.

6. Rather, I think we will be stronger and more effective

7. if we stick to those issues of governmental structure and process, broadly defined, that have formed the core of our agenda for years.

8. Open government, campaign finance reform, and fighting the influence of special interests and big money, these are our kinds of issues.

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[3]Letter used by permission

9. (New paragraph)   Let's be clear:

10. I personally favor the initiative and ardently support disarmament negotiations to reduce the risk of war.

11. But I don't think endorsing a specific nuclear freeze proposal is appropriate for CCC.

12. We should limit our involvement in defense and weaponry to matters of process, such as exposing the weapons industry's influence on the political process.

13. Therefore, I urge you to vote against a CCC endorsement of the nuclear freeze initiative.

      (signed) **Michael Asimow, California Common Cause Vice-Chair and UCLA Law Professor**

How is this text organized? At the most general level, the text as a whole functions as a request to vote in a certain way. At its coarsest level of decomposition, it has two parts. One part presents the request, presented in segment 13, and the remainder supports that presentation.

The theory has a number of patterns, called *rhetorical schemas*, that represent organizational information about text. To represent the particulars of two-part decomposition of the text, we use one of these rhetorical schemas, the Request Schema, Figure 1.
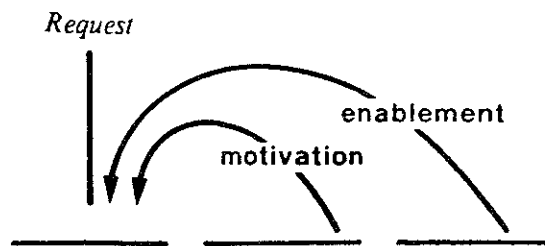

Figure 1: Request Schema

A text that instantiates the Request Schema has a nuclear part, called the *nucleus*, that presents a request. It also has one or more supplementary parts, called *satellites*, that are functionally related to the nucleus. Satellites are related to the nucleus by a named *relation*. Here we have relations named *motivation* and *enablement*.

Let us illustrate the parts of a Request Schema in a short example:

"Call me. I have a surprise for you. My extension number is 110."

The nucleus is "Call me," the motivation satellite is "I have a surprise for you," and the enablement satellite is "My extension number is 110." These elements can be arranged in any order and still be an instance of the Request Schema. Schemas do not encode the order of segments; in this case, the segments can be rearranged freely without disturbing their meaning or structural relation.

Satellites are all optional, so we can delete either one in this example and still instantiate the Request Schema--but there must be at least one satellite. The political text has a motivation satellite, segments 1 through 12, but no enablement satellite.

We analyze each of the two top-level segments of the political text in the same way. The final segment is a single unit, so we don't try to divide it. The first segment, 12 units long, consists of a claim (unit 1) and two arguments that give evidence for the claim. We analyze this arrangement with the Evidence Schema (Figure 2), in which the claim is the nucleus and an *evidence* relation connects the nucleus to the satellite. Figure 3 shows the resulting structure.
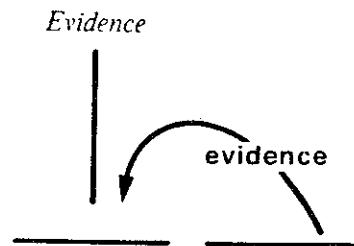
Evidence
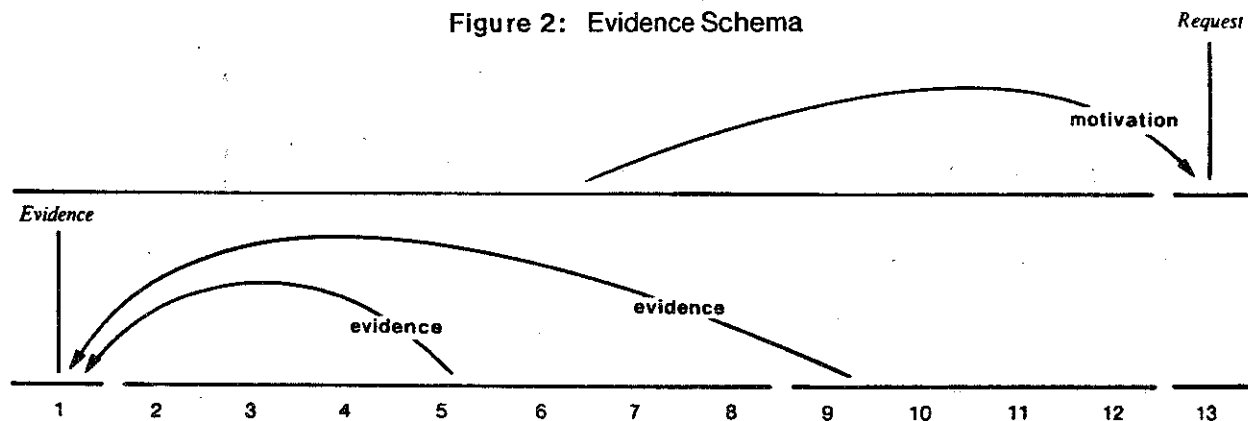
evidence

Figure 2: Evidence Schema

Figure 3: The Upper Structure of the Political Text

Both of the nuclei obey what we call the *Most Favorable Audience Rule*: For the most knowledgeable and positively predisposed hearer, the nucleus alone would be sufficient to perform the function of the structure; the satellites function to increase the likelihood that the nucleus will succeed. This rule is a summary of many observations about the rhetorical structures of texts. It does not always hold, but there is a strong, unexplained tendency for it to hold.

In this case of the Request Schema, presenting the request (to vote in a certain way) to a favorably predisposed hearer would be enough to get that reader to vote as desired; the supporting argument makes the desired vote more likely for most readers.

This application of the Evidence Schema contains two arguments: One says that the proposal is wasteful, and the other says that better alternatives exist. They make the reader more likely to accept the claim that endorsement is not right.[4]

The analysis goes on, down to single units. Figure 4 shows the additional schemas used. They are drawn from a larger set of about 25 schemas, defined through use of about 30 relations.
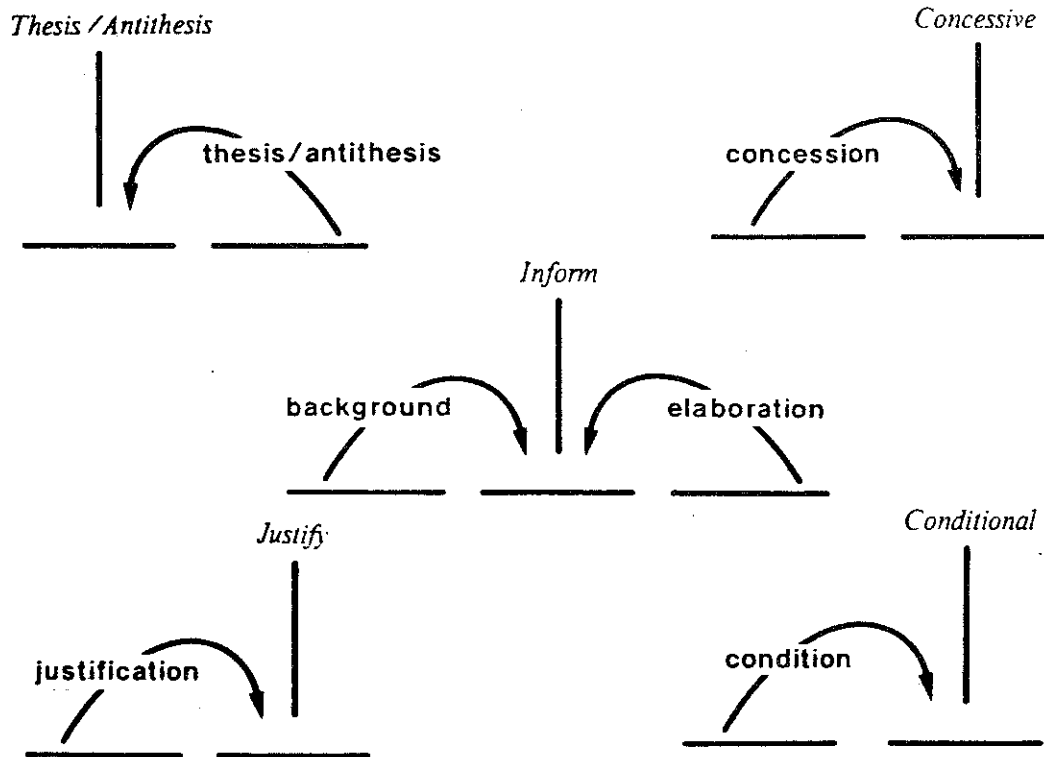

Figure 4: Other Schemas Used to Analyze the Political Text

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[4] Although the unit begins "I don't believe that...," the claim here is really about whether this step is right for CCC. The evidence that follows in units 2 through 11 is about what benefits CCC, not about whether the author believes this claim or not. RST does not represent the indirectness of the form of the claim.

To illustrate the relations used here, we turn back to the text.

The *thesis/antithesis* relation connects units 11 and 12.   11: "But I don't think endorsing a specific nuclear freeze proposal is appropriate for CCC."   12: "We should limit our involvement..."

The *concessive* relation connects units 2 and 3:   2: "Tempting as it may be," 3: "we shouldn't embrace every popular issue that comes along."

Unit 8 is an *elaboration* for the Inform Schema; it lists instances, such as open government and campaign finance reform.

Unit 9 says "Let's be clear." This is in a *justification* relation to the argument that follows, in 10 through 12. It obtains permission to present a second argument, defending the same conclusion.

Finally, units 4 and 5 are in a *condition* relation. 4: "When we do so..." 5: "we use precious resources..."

Figure 5 shows the structure of the whole text.

2.1 Definition Mechanisms of RST

How is RST defined? How do claims about particular texts arise from an RST analysis of it? The theory is defined in terms of just three mechanisms: schemas, schema application conventions, and relation definitions.

Schemas are simply sets of relations. There is no schema-specific information beyond the identities of the relations that comprise the schema.

Schema application conventions are descriptions of what it means for a particular span of text to instantiate a schema. Its conventions are easy to state:

1. One schema is instantiated to describe the entire text.

2. Schemas are instantiated to describe the text spans produced in instantiating other schemas.

3. The schemas do not constrain the order of nucleus or satellites in the text span in which the schema is instantiated.

4. All satellites are optional.

5. At least one satellite must exist.

6. A relation that is part of a schema may be instantiated indefinitely many times in the instantiation of that schema.
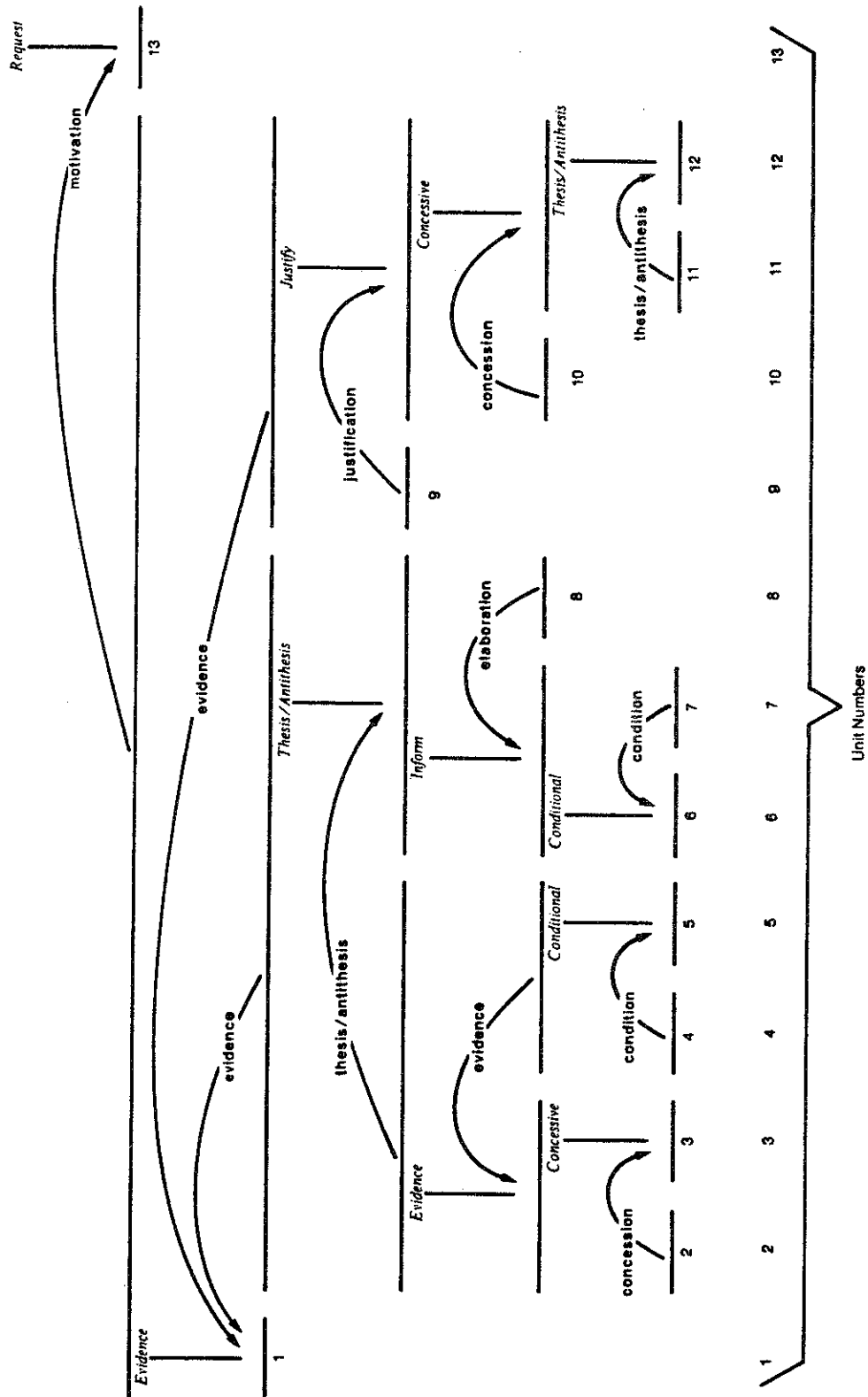
Figure 5: Full Rhetorical Structure of the Political Text

7. The nucleus and satellites do not necessarily correspond to a single uninterrupted text span.

8. The relation definition must be consistent with the spans of text related by the instantiation of the schema containing the relation.

It is possible for the conventions to apply to a text in more than one way, so that the text is rhetorically ambiguous.

A <u>relation definition</u> specifies three kinds of information:

1. A characterization of the nucleus.
2. A characterization of the satellite.
3. A characterization of what sorts of interactions between the conceptual span of the nucleus and the conceptual span of the satellite must be plausible.

To define, for example, the motivation relation, we would include at least the following.

1. The nucleus describes an action performable, but not yet performed, by the reader.
2. The satellite describes the action, the situation in which the action takes place, or the result of the action in ways that help the reader associate value assessments with the action.
3. The expected value assessments are positive, to lead the reader to want to perform the action.

The relational propositions do not arise independently of the relation definitions. Rather, finding that a relation definition holds is sufficient to establish the corresponding relational proposition. As readers recognize the functional relations of the parts, they are recognizing that the relation definitions hold. The content of the relational proposition is identified in this process. As a consequence, the definition scheme for RST requires no additional definitions in order to specify the relational proposition. In any particular case, the proposition can be derived from the way the relation definition fits.

We have found the relation definitions, useful in predicting other facts about the text, such as the kinds of conjunctions that will appear in certain places. We have analyzed a large number of texts, including thousands of clauses, in this way. We are confident that we can perform this analysis, with fairly high reliability, for virtually any small, written, multisentence monologue in general American culture, using only about 25 schemas.

Note that these rhetorical schemas are defined in terms of the <u>functions</u> of segments of text. The evidence relation applies when one segment supports another as evidence. Solutionhood applies when we can see one segment as identifying a

problem and another as a partial solution to that problem. These are not criteria of form; as one might expect, the relationship of these function categories to form categories is quite loose. The rhetorical structure of text, in these terms, is composed of <u>function-specific units.</u> The structure does not express categories of knowledge or form as much as it expresses the roles of specific parts in relation to the whole text, especially the role of each satellite relative to one particular, immediate portion of the text, the corresponding nucleus.

3 RST as an Account of Relational Propositions

The key observation for the purposes of this paper is:

For every relation of the rhetorical structure of a text, a corresponding relational proposition is asserted.

For solutionhood relations, the discourse structure asserts a solutionhood proposition. For evidence relations it asserts an evidence proposition, and so forth. Readers attribute the assertions to the text because they recognize the functional relations of the parts.

Now we can explain why relational propositions are coherence-producing.

First, RST structures always have the connectivity of trees. The schema application conventions guarantee this, because when a span is decomposed, each of the parts is further decomposed separately.

If a portion of the text is to be connected to the whole without being a non-sequitur, some relation must be established. A relation is established through implicit assertion of a relational proposition. Since the relations form a tree, denial of any one relational proposition is sufficient to separate the structure into two parts, thus destroying connectedness, a key attribute of coherence.

Now we can also explain why relational propositions are always present in coherent multisentence texts. In regarding the text as a single whole, readers impute rhetorical structure to it, necessarily positing relations between the parts; the relations give rise to assertion of relational propositions.

We can also see how to create more precise specifications of relational propositions. They can be developed from the relation definitions of RST. RST tells what sorts of propositions can be relational, gives the conditions under which relational propositions arise, and tells how to alter a text or a situation so that the asserted relational proposition is changed. Rather than simply searching texts for potential relational propositions, we can search rhetorical structures for the necessary relational propositions.

4 Uses of Rhetorical Structure Theory

Rhetorical Structure Theory provides an attractive basis for explaining relational propositions, although some details need development.

In addition, RST satisfies some of the attributes identified in section 2, above, as desirable for a descriptive theory of text organization. It is <u>comprehensive</u> enough to apply to many different kinds of text; it is <u>functional</u>, in that it explains what various portions of a text do for the writer. And it is <u>scale insensitive</u>, applying to a wide range of sizes of units, from simple clauses up to whole magazine articles.

However, RST still lacks two desired attributes: It needs for more <u>detailed expression</u> of each part, and it would be useful to develop a <u>constructive</u> counterpart to the descriptions, a way to select schemas and plan texts.

In addition to these attributes, we recognize other opportunities for and benefits of RST.

1. It gives a partial account of the distribution of interclausal and intersentential conjunctions.

2. It leads to new observations of text phenomena, including some related to nuclei, such as the most-favorable-reader hypothesis.

3. The advantages of a recursive theory are obtained for text structure.

Beyond the phenomena identified above, RST appears to be useful in accounting for other kinds of discourse phenomena. We have found no boundary for its uses; it is like trying to delimit the uses of a grammar. We have identified the following as particularly attractive applications:

- Thematization and text development
- Distributions of tense selections in text
- Lexical selection
- Patterned shifts of hypotheticality, identifiability, or conditionality
- Patterns of use of conjunctions
- Purposeful clause combining
- Distribution of topicalization markers
- Text ordering (under way)
- Relating coherence to cohesive devices

5 Summary

The assertion of relational propositions is a hitherto unexplained phenomenon. Rhetorical Structure Theory provides a way to explain such assertions in terms of discourse structure. In addition to explaining relational propositions,

Rhetorical Structure Theory can be used to explain other text characteristics as well, and it provides a way to address a wide range of discourse phenomena.

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