Annotating for Argumentation Acts

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1 Introduction

You will be annotating a set of dialogs. Annotation is a process of marking useful information. You will be marking the "why" of parts of dialog, the relationships that identify the reasons people said sequences of things. That is, you will mark the patterns of speaking that people use to convince, to motivate, to inform and so on.

In order to do this, you need to know the answers to these questions:

- How is a dialog broken into parts? What is the size of one dialog "chunk"? (section 2)
- How will I know when I can stop? (section 3)
- How do I mark relations? (section 4)
- What does the annotation process look like? (section 5)

This manual answers these questions.

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2 Segmentation

The dialogs you will be looking at have been segmented (broken down) into **utterances**. Dialogs are broken into utterances using the following rules [1]:

- Break when the speaker changes
- Break when there is a syntactically complete unit (such as a clause or noun phrase), a breath or pause, and a prosodic boundary
- Break when there is a syntactically complete unit, a prosodic boundary, and a silence shorter than a pause
- Break when any two of the conditions in the second rule above are met

We will use utterances as **minimal spans** (the smallest dialog "chunks"). You will be marking relations that hold between pairs (sometimes three or more) of sequential spans. When you mark a relation, the spans involved are combined to form a new (non-minimal) span. You'll then mark relations that hold between sequences of those spans. You'll end up with something that looks like a family tree, with only a few spans at the top and the utterances down at the bottom.

2.1 Re-segmenting

Usually, utterances work fine as minimal spans. However, sometimes you may find yourself disagreeing with the existing segmentation.

Sometimes you may find a relation between two parts of the same utterance. In example 1, by saying "I know you like Mahler" the speaker attempts to motivate the hearer to attend the concert. Here, you might want to break the utterance into two spans.

Example 1

A	1	<You should attend the concert> <because I know you like Mahler>

Sometimes you may think that two utterances should be one span. In example 2, utterance 2 completes utterance 1. You might want to join these two utterances to form one minimal span.

Example 2

A	1	Have you ever read the Terry Pratchett book, um, "Witches"
B	2	"Witches Abroad"?
B	3	Yes, I loved that book

You can change the segmentation as you annotate, if you note in your comments file the utterance(s) you modify and the reason for the modification. In general, you should ensure that the segmentation satisfies the following definition for minimal spans.

A minimal span must be one of the following, with earlier possibilities taking precedence over later ones:

1. A phrase/clause separated from the immediately prior phrase/clause by a cue word such as "because" or "since", where there is a relation between the two parts
2. A syntactically complete stretch of continuous speech
3. A stretch of continuous speech ended by a pause, a prosodic boundary or a change of speaker

2.2 Timing

Sometimes you will notice that both speakers talk at once. In the transcript, overlapping speech is indicated with +'s. For the purposes of this annotation, we must impose an ordering on minimal spans. We will say that one utterance succeeds another if it starts after the other.

If two utterances overlap at the very beginning, and you think that the one listed second relates more closely to the previous material than the one listed first, then you can reorder the utterances. In the following example, utterances 2 and 3 both started at almost the same time and overlapped. Because of the repetition ("Bath next") we can see that utterance 3 clearly is more closely related to utterance 1 than to utterance 2. So we might reorder utterances 2 and 3.

Example 3 [3]

A	1	Let's go to Bath next.
A	2	+ Then let's go + to Corning.
B	3	+ Bath next mm-hm +

This is the only instance where you may reorder utterances.

3 When to stop

As you continue annotating, you will find yourself marking relations between bigger and bigger spans. Ideally, you would keep annotating until you had two or three spans covering the entire dialog, and then you would mark one relation between those spans. In practice, however, it is very difficult (and often not very useful) to achieve complete coverage of the dialog.

How do you know when you can stop annotating? You may think there is nothing more to do, but if you leave it for awhile you may see things you didn't see before. However, there are several conditions under which you may conclude you have a complete annotation:

1. You might end up with one span that covers the whole dialog.
2. You might reach a point where the structure between the spans is exactly the structure of the task the speakers are solving or the plan they are making.
3. You might find that there are only a few spans, and they correspond to a pattern resulting from how the dialogs were collected. In the case of these dialogs, that might be three spans, one in which the task is described, one in which it is solved, and one in which the solution is summarized.
4. You might reach a point where you cannot mark any relation.

If any of these conditions are met, you may stop annotating. You should mark in your comments file the specific reason that you stopped. If you have more than one top-level span, check with your supervisor or another annotator to ensure that you have not stopped too soon.

4 Marking relations

This section describes in general the relations that you can mark between spans in a dialog. For details about a specific relation, see section 6.

We have divided the relations into four groups: presentational relations, subject-matter relations, adjacency pairs and schemas. Presentational relations serve to increase a desire in the hearer, such as the desire to act, or the inclination to like something or respect some belief. It is not necessary that the hearer recognize the purpose behind spans forming parts of a presentational relation. It is, however, necessary for a hearer to recognize the relations in the other categories. If the hearer doesn't recognize these, the dialog will seem incoherent to the hearer.

For each set of spans, you should mark a subject-matter relation. You should also try to mark a presentation relation for each set of spans, and you should consider marking an adjacency-pair. If you can't mark any other kind of relation, consider marking a schema. If the appropriate relation of one type covers a slightly different set of spans than the appropriate relation of another type, mark both. At the next level of annotation, you will have to decide which possible resulting spans to use.

Occasionally, you may think more than one presentational relation or (rarely) more than one subject-matter relation is appropriate for a particular set of spans. Select one to mark, and write the others in the comments file.

The sets of relations we give here are designed to cover everything you might encounter in the dialogs you see. However, if you find a relation that is not listed here, you may consult with your supervisor or other annotators about adding it to the list.

For each of the relations that we list below, we include the name of the relation, a short definition, a test for applicability and some examples. We may also give other helpful information. Occasionally, we include some discourse cues (cue words or cue phrases) that can signal the presence of the named relation. However, it is very likely that the relation may be used but not be marked by any discourse cue. Also, some discourse cues may mark any of several relations. **Do not use discourse cues as the sole indicator of a relation.**

For each category of relations, we have given either a decision tree (written as a list of questions) or a list of the relations in that category. You should use the decision trees to help you identify the appropriate relation.

4.1 Nuclearity

Most (but not all) of these relations hold between two spans. One of these spans will usually be more important in the context of the dialog than the other. You can test which one it is by asking yourself:

- Which span could I delete and still have the other make sense in this dialog?
- Which span could I replace and not lose any information in this dialog?

For instance, in the following short dialog utterance 2 is justification for utterance 1. The dialog would still make sense (would still be coherent) if utterance 2 were removed, but not if utterance 1 were removed.

Example 4

A	1	I'm going to call the company
A	2	because I still didn't get my bill
B	3	Okay.

When one span is more crucial to the coherence of the dialog than another, we call it the **nucleus**. The less-crucial span is called the **satellite**.

It is not always the case that one span is more important than the other. In the following dialog the speakers are listing a sequence of events. You could not remove any one event without defeating the purpose of the dialog:

Example 5

A	1	First put the oil pan ready under the oil cap.
A	2	Then unscrew the oil cap.
A	3	Wait for the oil to drain out.
A	4	Screw the cap back on.
B	5	And then put the fresh oil in from the top of the engine?
A	6	That's right.

It is possible for there to be more than one satellite in the spans for a relation, but as long as there is at least one satellite there cannot be more than one nucleus. That is, there are two possible patterns: multiple nuclei and no satellites, or one nucleus and one or more satellites.

When you are marking relations, you should mark the nucleus or nuclei.

4.2 Leaving out utterances

Sometimes an utterance has been abandoned, or two speakers will start speaking together and then both stop, or a speaker will speak to the experimenter rather than to their partner. For these or other reasons, it may be necessary to "discount" an utterance. This means that you skip over it when making relations, as if it weren't there. You should mark discounted utterances. Try not to mark an utterance as discounted unless absolutely necessary.

4.3 Marking content

For certain relations, it is necessary to give an indication of the type of the content. In these cases, you should mark the content-type right after marking the relation. It is important to read the relation definition to find out if you need to mark content-type for a given relation.

5 Annotation process

The basic process you will use is as follows:

1. Listen to the entire dialog. You will be able to read the transcript while you are listening. You will have access to the same materials the original speakers used, in this case maps, task descriptions and other information. While you are listening to the dialog, you can observe how the speakers shared information with each other and developed their plan.
2. Starting at the beginning of the dialog, identify the relations that hold between different parts of the dialog. The procedure you should use to find and mark a relation is as follows:
   (a) Use the decision tree for the presentational relations to identify a presentational relation to mark, if any.
   (b) Check the definition of the relation to make sure it is applicable and to clarify how to mark it.
   (c) Now, use the decision tree for the subject-matter relations to identify a subject-matter relation to mark, if any.
   (d) Check the definition of the relation to make sure it is applicable and to clarify how to mark it.
   (e) Now, check the list of adjacency-pair relations. If you find an appropriate one to mark, do so.

(f) If you cannot identify a presentational relation, a subject-matter relation or an adjacency-pair, then check the list of schemas to find one to mark.

3. If you have a question or comment or need to note a confusion, write it down in a comments file, with the utterance number or some other appropriate label. You should definitely make comments in the following circumstances:

   (a) If you re-segment utterances, note which ones.

   (b) If you think more than one relation in a given category (e.g. subject-matter relations) seems relevant, note the others.

   (c) When you stop annotating, note why.

4. Continue identifying relations until you have covered the whole dialog and satisfied the constraints in section 3.

1. In this set of spans, is the speaker attempting to affect one of the hearer's beliefs, one of the hearer's attitudes, or the hearer's ability to perform some action?
   - Belief – go to question 2
   - Attitude – go to question 3
   - Ability – *enablement (6.1)*
2. Is the speaker trying to increase the hearer's belief in some fact, or enable the hearer to better understand some fact?
   - Belief – *evidence (6.1)*
   - Understanding – *background (6.1)*
3. Is the speaker trying to convince the hearer that they have the right to make some claim?
   - Yes – *justify (6.1)*
   - No – go to question 4
4. Is the speaker trying to increase the hearer's desire to perform some action?
   - Yes – *motivation (6.1)*
   - No – go to question 5
5. Are the situations presented in N and S in contrast?
   - Yes – *antithesis (6.1)*
   - No – *concession (6.1)*

Figure 1: Decision tree for presentational relations

6 Relation descriptions

This section gives details about the relations you will use. In the descriptions and in the decision trees, S is the satellite and N is the nucleus.

6.1 Presentational/Intentional relations

These relations identify different ways that a speaker might try to influence a hearer. A speaker may say something to affect the hearer's beliefs or attitudes, or to facilitate the hearer's ability to perform an action or understand a statement.

The decision tree for these relations appears in figure 1. When marking these relations, remember to follow the tree, and at the end confirm your choice by checking the relation definition and the examples.

The definitions for these relations come from [3].

Evidence

Conditions:

1. The hearer believes S or will find it credible.
2. If the hearer knows S, it will increase the hearer's belief of N.

Example 1

(N) The SlimQuick diet program really works!
(S) In only three weeks, I lost nine pounds, all while eating whatever I wanted.

Example 2 [2]

A	1	There's no other quicker way right?
B	2	(N) Uh I don't think so let's see what
	3-5	(S) So the one that takes the longest is to make the orange juice and there doesn't seem to be a quicker way to do that because we have to go get the oranges and back again
	6	right no that looks like the fastest

Justify

Conditions:

1. If the hearer knows S, the hearer will be more likely to believe that the speaker has the right to say N.

Example 1 [1]

(N) The next music day is scheduled for July 21 (Saturday), noon-midnight.
(S) I'll post more details later, but this is a good time to reserve the place on your calendar.

Example 2 [3]

A	1	(S) I have the paper right here,
	2	(N) and it says that there are only three boxcars.

Example 3 [2]

A	1	(N) You'll have to tell me what it is.
	2	(S) I don't have their labels.

Antithesis

Conditions:

1. The situations of N and S are in contrast.
2. One of the differences between N and S means that N and S can't simultaneously be viewed positively.
3. The speaker views the situation of N positively.
4. Knowing S will increase the hearer's positive regard for the situation of N.

Example 1
(N) A poor performance on a standardized test may result from cultural differences.
(S) A lack of knowledge is not always the problem.

Example 2 [4]
A 1 (S) We could go to Dansville first,
2 (N) but if we go to Bath first the other train can freely travel back and forth to Corning.

Example 3
A 1 (S) We could buy a house.
B 2 (N) Yes, but an apartment is so much easier to sell.

Concession

Conditions:

1. The speaker thinks positively about the situation of N.
2. The speaker is not saying that S is not true.
3. The speaker acknowledges a potential or apparent incompatibility between S and N.
4. The speaker thinks that the situations of S and N are compatible.
5. If the hearer realizes that the situations of S and R are compatible, the hearer's positive view of the situation of N will be increased.

Cue words: "Although"

Example 1
(S) Although use of Primelene can lead to troubling side effects in some individuals,
(N) these are manageable, and for most users, it is a life-saver.

Example 2
A 1 (S) We'll be really tired if we don't return until Sunday.
2 The extra time in Israel will be worth it, though.

Background

Conditions:

1. The hearer won't understand N properly without S.

Note: Before marking a *background* relation, check to make sure it is not really some other relation. The background relation should not in general be marked where an action or belief is being discussed, but only where N presents a simple fact.

Example 1
I can't play any sports.
When I was a child, I broke my leg and it never healed properly.

Example 2

A	1	I am scared of loud noises.
B	2	Why?
A	3	I used to live in Kosovo, and there was always fighting.

Example 3
It was a gorgeous evening.
There was a lovely sunset and we had such a good meal.

Enablement

Conditions:

1. N presents an unrealized action for the hearer to perform.
2. If the hearer knows S, the hearer will be better able to perform the action of N.

Cue words: "How" questions.

Example 1
(N) You'll need to buy stamps.
(S) You can get them from the machine in the corner using these tokens.

Example 2 [3]

A	1	(N) You'll have to go to Corning first.
B	2	(S-1) Where is Corning?
A	3	(S-2) Oh it's South of Bath.

Example 3 [3]

A	1	(N) We have to make orange juice first.
B	2	(S-1) How do we do that?
A	3	(S-2) Take the oranges to Corning where the orange juice factory is.

Motivation

Conditions:

1. N presents an unrealized action for the hearer to perform.
2. If the hearer knows S, they will be more likely to want to perform the action of N.

Helpful hint: If one of the spans is an invitation, offer or command, and you can put "because" in front of the other, this relation probably holds.

Example 1

(N) You should really come to the concert tonight.
(S) It's a once-in-a-lifetime chance to hear this performer.

Example 2

(S) We don't want to be late.
(N) So we'll not go to the store first.

Example 3 [4]

A	1	So we have to make orange juice first,
	2	So we're going to send engine two from Elmira to Corning to get the tanker.

1. Is the relationship between S and N a causal relationship between an action/event and a situation? Does it answer the "why" question?
    - Yes – go to tree 1
    - No – go to question 2
2. Do the spans give information about different situations/actions/objects, or only one?
    - Different – go to tree 3
    - One – go to tree 2

Figure 2: Decision tree for subject-matter relations

1. Is the action or event planned/meant?
    - Yes – go to question 2
    - No – go to question 4
2. Is the situation true at the time it is discussed (a present situation), or is it a future situation?
    - Present – go to question 3
    - Future – *purpose (6.2)*
3. Is the action/event more central than the situation causing it, or is the situation more central?
    - Action/event – *volitional cause (6.2)*
    - Situation – *volitional result (6.2)*
4. Is the action/event more central than the situation causing it, or is the situation more central?
    - Action/event – *non-volitional cause (6.2)*
    - Situation – *non-volitional result (6.2)*

Figure 3: Tree 1: Subject-matter relations

1. Does S give additional information about N?
    - Yes – go to question 3
    - No – go to question 2
2. Is the length of N the same as the length of S?
    - Yes – *restatement (6.2)*
    - No – *summary (6.2)*
3. Does N present a situation that S evaluates/measures?
    - Yes – go to question 4
    - No – go to question 5
4. Is the measure the speaker's subjective opinion, or is it objective?
    - Subjective – *evaluation (6.2)*
    - Objective – *interpretation (6.2)*
5. Does S contradict N?
    - Yes – *correction (6.2)*
    - No – go to question 6
6. If S was not known but N was, would it seem that the opposite of S was true?
    - Yes – *counter-expectation (6.2)*
    - No – go to question 7
7. Does S give a solution to a problem presented in N?
    - Yes – *solutionhood (6.2)*
    - No – go to question 8
8. Does N present a situation for which S gives a temporal or spatial framework?
    - Yes – *circumstance (6.2)*
    - No – go to question 9
9. S gives additional factual detail about N. Use one of the following relations:
    - *set:member (6.2)*
    - *abstract:instance (6.2)*
    - *whole:part (6.2)*
    - *process:step (6.2)*
    - *object:attribute (6.2)*
    - *generalization:specific (6.2)*

Figure 4: Tree 2: Subject-matter relations; S = satellite; N = nucleus

1. Are the items being compared?
    - Yes – go to question 2
    - No – go to question 3
2. Are the items being:
    - Compared with respect to their differences? – *contrast (6.2)*
    - Compared with respect to their similarities? – *compare (6.2)*
    - Presented as alternatives? – *alternatives (6.2)*
3. Is there a sequence of situations?
    - Yes – *sequence (6.2)*
    - No – go to question 4
4. Can the contents of the spans be simultaneously true?
    - Yes – go to question 5
    - No – go to question 6
5. Are there two situations, one of which has to be true for the other to be true?
    - Yes – *condition (6.2)*
    - No – *counter-expectation (6.2)*
6. Does the contents of one of the spans solve a problem presented in the other?
    - Yes – *solutionhood (6.2)*
    - No – *otherwise (6.2)*

Figure 5: Tree 3: Subject-matter relations

6.2 Informational/Subject-matter relations

These relations identify relationships between items in the contents of what a speaker or speakers said.

The decision tree for these relations starts in figure 2. When marking these relations, remember to follow the tree, and at the end confirm your choice by checking the relation definition and the examples.

The definitions for these relations come from [3].

Circumstance

Conditions:

1. S presents a situation that is true.
2. S provides a framework (temporal or spatial) for interpreting N.

Mark with: When you mark the circumstance relation, you must also specify the type of the circumstance. The allowed types are:

- time-location ("before", "after", or a specific time)
- time-duration (e.g. "from 3 until 5")
- co-occurrence (e.g. "at the same time as...")
- space-location (e.g. "at my house")
- space-duration (e.g. "from my house to your house")

Contrast with: *condition.*

Cues: Hypotactic clauses, e.g. X when Y, X where Y.

Example 1
(N) I was in a bad car accident once,
(S) when I was still an inexperienced driver.

Example 2 [2]

A	1	(N) Determine the maximum number of boxcars of oranges that you could get to Bath by seven a.m. tomorrow morning
A	2	(S) It is now midnight.

Solutionhood

Conditions:

1. S presents a problem.
2. N presents a solution to this problem.

Important Note: In the original definition of this relation, "problem" was defined to include questions, requests for information and other requests, descriptions of desires, goals, gaps in knowledge or needs, and conditions that carry negative values such as frustrations. We do not include requests for information or other requests (offers, commands) in this relation because these are covered by other relations.

Example 1
(S) Are you coughing?
(N) Sinex can cure your cold!

Example 2 [4]

A	1	(S) We'll need a tanker for the orange juice.
B	2	(N) Okay, when we're at Corning we'll take it back with us.

Abstract:instance

Conditions:

1. S presents an instance of, or example of, the concept described in N.

Contrast with: *set:member.*

Example 1
(N)The pongid family of the order primate is closely related to mankind.
(S)A particularly interesting example of the pongid is the chimpanzee.

Set:member

Conditions:

1. S presents a member of the set described in N.

Contrast with: *abstract:instance, generalization:specific.*

Example 1 [3]

A	1	(N)We have three boxcars altogether.
A	2	(S)The one at Bath is the closest.

Whole:part

Conditions:

1. S presents a part of the situation of N, a part of the subject matter of N, or a part of something related to N.

Contrast with: *process:step.*

Example 1 [1]
(N) The 25th Conference on Artificial Intelligence will be held June
25-29 at Dover Beach, MD.
(S) Topics will include robotics, NLP and computer vision.

Process:step

Conditions:

1. S presents a step in the process described in N.

In the example below, utterances 2 and 3 form a *sequence*, which is related to utterance 1 by *process:step*.

Example 1 [4]

A	1	(N) You want to move oranges there
A	2	(S) What you'll have to do is you'll have to pick out an engine
	3	And schedule a train to do that.

Object:attribute

Conditions:

1. S is a property of the situation of N, a property of the subject matter of N, or a property of something related to N.

Mark with: When you mark the object:attribute relation, you must also specify the type of the content of the attribute. The allowed content markings include (but are not limited to):

- location
- owner
- structure/shape
- contents
- size/capacity
- number
- type/class

Contrast with: *circumstance.*

Example 1

A	1	(N)I have two saucepans.
	2	(S)Each holds 3 quarts.

Generalization:specific

Conditions:

1. S is a situation, object or action related to the material presented in N, but is more specific than N.

Contrast with: *set:member, abstract:instance, whole:part, process:step.*

Example 1

(N)My work is in the field of computer science.
(S)My current research is in artificial intelligence.

Volitional cause

Conditions:

1. N presents a purposeful action, or a situation that came about because of one.
2. S presents a situation that could have caused the performer of the action of N to do that action.
3. Without S, the reason for performing the action of N, or the fact that the action of N was purposeful, might not be evident.
4. The action or situation of N is more closely related to the subject of the conversation (more topical) than the situation of S.

Contrast with: *volitional result.*

Cue words: "Because".

Example 1 [1]
(S) Writing had become almost impossible
(N) so we had the typewriter serviced
and I may learn to type decently after all these years.

Non-volitional cause

Conditions:

1. N presents a situation that is not a volitional (purposeful/chosen) action.
2. S presents a situation that is the cause of the action in N.
3. Without S, the hearer would not know the cause of the situation in N.
4. N is more topical than S.

Contrast with: *non-volitional result.*

Cue words: "Because".

Example 1 [1]
(S) Because we can mine more than we need,
(N) we've had plenty of manganese and iron ore for export.

Example 2
(S) It was stormy, and the boat was tossing.
(N) She felt ill.

Volitional result

Conditions:

1. S presents a purposeful action or a situation that could have arisen from a purposeful action.
2. N presents a situation that could have caused the situation of S.
3. N is more topical than S.

Contrast with: *volitional cause.*

Example 1
(N) We were so poor,
(S) we ate cabbage for three months straight.

Non-volitional result

Non-volitional results are generally side-effects of actions.
Conditions:

1. S presents a situation that is not a purposeful action.
2. N presents a situation that caused the situation presented in S.
3. N is more topical than S.

Contrast with: *non-volitional cause.*

Example 1 [1]
(N) The blast destroyed the plant and most of the surrounding suburbs.
(S) Several thousand people were injured, and about 300 are still in hospital.

Purpose

Conditions:

1. N presents an activity.
2. S presents a situation that is not true yet but will become true as a result of performing the activity of N.

Cue words: "In order to", "To".

Example 1
(N) She climbed a tree
(S) to see if there were houses near.

Example 2 [2]

A	1	(N) Take those to uh Corning
A	2	(S-1) To pick up the oranges
B	3	(S-2) Okay

Condition

Conditions:

1. S presents a situation that is not currently true, e.g. is hypothetical, or in the future.
2. The situation of N cannot arise without the situation of S being true.

Cue words: "If".

Example 1
(S) When you see Lucy,
(N) Jane is not far behind.
They are always together.

Example 2 [2]

A	1	(S) If we delay engine three for an hour
	2	(N) then then we're fine.

Example 3 [3]

A	1	(S) What if the train gets too full?
B	2	(N) We'll just send another one.

Otherwise

Conditions:

1. The situation of N is not currently true.
2. The situation of S is not currently true.
3. If the situation of N happens, the situation of S will not or cannot happen.

Cue words: "Otherwise".

Example 1 [3]

A	1	(N) We have to send two boxcars
	2	(S) Or we won't get them all.

Example 2
(N) You should get down to Jones' car dealership now.
(S) Otherwise, you'll miss the best deal this year.

Interpretation

Conditions:

1. S relates the situation presented in N to a framework of ideas or measure not stated in N.
2. This measure is not the speaker's attitude or personal feeling.

Contrast with: *evaluation.*

Example 1
(S) This year is very warm.
(N) We have had 30 days of record high temperatures so far.

Evaluation

Conditions:

1. S expresses the speaker's attitude towards the situation presented in N.

Contrast with: *interpretation.*

Example 1 [2]

A	1	(N) How about we go back to Elmira and then fill up with the orange
	2	(S) Oh no no no gracious gracious bad bad move

Restatement

Conditions:

1. S rephrases N.

Contrast with: *summary.*

Example 1 [3]

A	1	(N) Then take the train to Elmira
B	2	(S) First train to Elmira

Summary

Conditions:

1. S restates N in a shorter form.

Contrast with: *restatement.*

Example 1 [3]

A	1-3	(N) So the first engine takes two boxcars of oranges from Avon to Corning And the second one takes two tankers to Corning to pick up the OJ And then it goes to Bath.
B	4	(S) Oranges from Avon to OJ in Bath.

Sequence

Conditions:

1. The spans in the relation describe a succession of situations.

Important note: This relation can have more than two spans, all of which are nuclei.

Example 1

(N) First you jack up the car
(N) Take off the old tire,
(N) then put on the new one.

Contrast

Conditions:

1. No more than two spans (both nuclei).
2. The situations in the spans are the same in many ways.
3. The situations in the spans are different in a few ways.
4. The situations in the spans are compared with respect to one or more of these differences.

Contrast with: *compare.*

Example 1

A	1	(N) My cat is fuzzier than your cat.
B	2	(N) Well, my cat is more playful.

Compare

Conditions:

1. No more than two spans (both nuclei).
2. The situations in the spans are the same in one or more ways.
3. The situations in the spans are compared with respect to one or more of these similarities.

Contrast with: *contrast.*

Example 1

A	1	The family resemblance in Jane and Lisa is clear.
A	2	(N) They both have that high forehead.
B	3	(N) They have the same nose as well.

Counter-expectation

Conditions:

1. S elaborates on N, provides additional information about the contents of N.
2. The hearer would otherwise think the opposite of S was true.

Cue words: “Contrary”.

Example 1

Contrary to what one would expect of a brain injury,
many who have had suffered injury to the corpus callosum continue to function normally.

Correction

Conditions:

1. Two spans, both nuclei.
2. One of the spans corrects some information contained in or inferable from the other.

Example 1 [3]

A	1	Send the boxcar to Corning.
B	2	We already sent it to Bath, remember?

Alternatives

Conditions:

1. At least two spans, all nuclei.
2. Each of the spans describes an alternative to the other spans.

Example 1 [3]

A	1	So we can't do this unless we send the boxcar first.
B	2	Or unless we attach two boxcars to one engine.

6.3 Adjacency pairs

These will probably be easier to recognize than most other relations. If there are sub-types for one of these relations, mark the appropriate sub-type.

Here is a list of these relations:

1. Greeting-response
2. Summons-response
3. Question-response
   (a) Question-answer
   (b) Question-no-answer
4. Assertion-response
   (a) Assertion-acknowledge
   (b) Assertion-modify
   (c) Assertion-reject
   (d) Assertion-hold
5. Proposal-response
   (a) Proposal-accept
   (b) Proposal-modify
   (c) Proposal-reject

Greeting-response

Conditions:

1. N contains a greeting or other social formula.
2. S acknowledges N.

Example 1

A	1	Hi.
B	2	Hello.

Example 2

A	1	Thanks.
B	2	No problem.

Summons-response

Conditions:

1. N contains a summons or prompt.
2. S contains a response to N.

Contrast with: *question-response.*

Example 1

A	1	Can you hear me?
B	2	Not very well.

Example 2

A	1	Right?
B	2	Yes.

Question-response

Conditions:

1. N contains a request for information.
2. S contains a response to N, either an answer, or an indication that the speaker doesn't know the answer, or an indication of lack of understanding.

Subtypes:

- Question-answer
- Question-no-answer

Important note: Many utterances that look like questions are <u>not</u> in fact requests for information. Prompts ("Hello?" "You there?" "Right?") and commands phrased as questions ("Could you shut the door?") are two particularly misleading such groups of utterances.

Contrast with: *summons-response, proposal-response.*

Mark with: When you mark the question-response relation, you must also specify the type of the content of the question. The allowed content markings are:

- yes-no (if no other content type applies)
- time-location ("When")
- space-location ("Where")
- agent ("Who")
- reason ("Why")
- object ("What")
- process ("How")
- measure (number, size, distance, etc.) ("How much", "How far", "How long", etc.)

Example 1 [3]

A	1	How many boxcars are there?
B	2	Two.

Assertion-response

Conditions:

1. N contains an assertion.
2. S contains a response to N.

Subtypes:

- Assertion-acknowledgment
- Assertion-modify
- Assertion-reject
- Assertion-hold

Contrast with: *proposal-response.*

Example 1 [3]

A	1	(N)And then the engine goes to Avon.
B	2	(S)That's right.

The following is an example of an *assertion-hold.*

Example 1 [3]

A	1	(N)We then go on to Bath.
B	2	(S)Um...

Proposal-response

Conditions:

1. N contains a proposal: a command, offer, suggestion, or request for assistance (other than a request for information).
2. S contains a response to the proposal.

Subtypes:

- Proposal-accept
- Proposal-modify
- Proposal-reject

Contrast with: *assertion-response, question-response.*

Example 1 [3]

A	1	We could send the engine via Avon first.
B	2	Okay.

Example 1 [3]

A	1	We could send the engine via Avon first.
B	2	Yes, if we let it pick up two boxcars on the way.

Example 1 [3]

A	1	We could send the engine via Avon first.
B	2	No, if we do that we'll never get there on time.

6.4 Schemas

The relations described here are either specific to our chosen domain, specific to the dialog-type, or are more structural than rhetorical.

Here is a list of these relations:

1. Joke
2. List
3. Describe-situation
4. Make-plan

Joke

Conditions:

1. S is a joke related to the content of N.

Example 1

A	1	(N) Then the train goes to Bath.
B	2	(S) Train to Bath to take a bath....

List

Conditions:

1. Two or more spans, all nuclei.
2. The spans form a conjunction or list.

Contrast with: *sequence*.

Example 1

A	1	How many questions will be on the exam?
B	2	There will be two review questions on differentiation,
B	3	and three review questions on integration.
B	4	There will be five more on new topics.

Describe-situation

Conditions:

1. At least one span. All spans involved are nuclei.
2. The spans all describe different sub-parts of the same situation.

Contrast with: *object:attribute, process:step, whole:part*.

In the following example, the last three spans form a *describe-situation*, and the resulting span and the first span form a *object:attribute*.

Example 1

The scene of the accident was a mess.
There were four cars in the middle of the road.
Glass and oil covered all four lanes.
Traffic was backed up for three miles.

Make-plan

Conditions:

1. At least one span. All spans involved are nuclei.
2. The contents of the spans, taken as a whole, form a plan.

Contrast with: *sequence.*

Example 1 [3]

A	1	Send one engine to Corning.
B	2	Okay.
...		
A	15	And finally, back to Corning.
B	16	Right. All done.

7 The Annotation Tool

The annotation tool you will use is a simple Java application. You can run it on any platform, if you download the Java platform first.

7.1 Getting and installing the tool

The tool is available from http://www.cs.rochester.edu/ stent/rst under the Gnu public license. Please email stent@cs.rochester.edu when you download the tool.

To install the tool, download it, unzip it, and compile the files. Complete instructions are available in the tool distribution.

7.2 Running the tool

To start the annotation tool, type `java ArgumentationTool` at the prompt. When the tool has started, you will see several menus. Use the leftmost menu to load and save files.

7.3 Loading and saving files; new dialogs

To start annotating a new dialog, if the dialog transcript has all utterances listed in order, and each utterance starts with "utt<number>:", go to the leftmost menu and select "New". Use the file-chooser to select the transcript, and click on "Open".

(If the dialog transcript is not in the required format, your site can write a tool to convert files into tree format. See section 8 for more information.)

To save your work, go to the leftmost menu and click on "Save". Select or type the name of the file you would like to save your work in.

To open a file containing a dialog in tree format (e.g. a dialog you have partially or completely annotated and saved), go to the leftmost menu and click on "Load". Select the name of the file you would like to load.

7.4 Making and deleting spans; re-segmenting

Use the buttons just below the menus to make and delete spans.

To make a new span, select one or more spans and then click on "Make span". The spans you select should form a sequence with no gaps.

To re-segment an utterance, select the utterance and then click on "Resegment". You'll see two copies of the text for the utterance. Double-click on the first text, and delete some of it. Double-click on the second text, and delete some of that.

To delete a span, select it and then click on "Delete span".

To expand a span (so you can see its parts), click on the little symbol just to the left of the icon for the span.

7.5 Moving spans

If you need to move more spans into a span, click on the one you want to move, hold down the control key, click on the destination parent, and then click on "Move span".

You have a lot of freedom to move spans around. Be careful not to confuse the ordering of utterances!

7.6 Nuclei

To identify a span as a nucleus, click on the span and then click "Nucleify". Click again to undo this process.

7.7 Discounting utterances

To mark a span discounted, click on the span and then click "Discount". Click again to undo this process. The "Discount" button should be used sparingly.

7.8 Marking relations

To mark a relation, select the span you would like to mark. Then go to the menu for the relation-type you would like to mark, and select the appropriate relation. It will be added to the annotated dialog. To remove that relation, simply select the span again and select that relation from the menu again.

Sometimes selecting a relation will open a little dialog box containing content-types. Select (or type in) the appropriate content type and click on "Set".

7.9 Making comments

Make your comments in the comment space at the bottom of the annotation tool. For each comment, note the utterance it applies to. If you save your annotation in the file `X.tree.txt`, the comments will be saved in `X.tree.txt.comments`.

8 Moving to new domains

This section contains a brief review of those areas of the manual and tool may need revision for a new domain or different type of discourse.

8.1 The manual

When we started this process, we looked at several existing annotation schemes, including [3, 4]. In our first attempt at annotation, we used [3]. We discovered that annotation schemes for marking rhetorical structure may need considerable modification before being used in new domains. Most of this modification is in the area of finding a set of relations that is descriptive in the selected domain and that is mutually exclusive. For a new type of discourse (e.g. moving from text to speech or monolog to dialog), there may be other issues, such as segmentation and coverage issues. The process of developing this annotation manual is described in [5], which describes some of these difficulties.

Determining what relations are needed to mark a particular type of discourse in a particular domain is a particularly time-consuming process. You can start with a standard set of relations ([3, 2]). Have one or two people mark a few dialogs/texts in the chosen domain or a closely related domain. Note those relations that are used, and leave out those that aren't. If one relation seems to be being used for a variety of phenomena, find or make more specific ones. If several relations are used to mark one phenomenon, remove all but one from the relation set.

If you use decision trees, you may need to write your own or modify the ones found in this manual. You may also want to add to the examples, although we have tried to provide a variety.

The presentational/subject-matter distinction is useful for a variety of different types of discourse, but adjacency pairs may not be necessary in monolog situations. Schemas may or may not be needed.

8.2 The tool

The first version of the annotation tool has been developed for our dialogs only. Future versions may be more general. Here we highlight some aspects of the tool that may pose challenges to others trying to use it.

Input files

There are two types of files that the tool can read. The first type of file contains a sequence of utterances. Each utterance should begin with "utt<number>:"; utterances may span multiple lines. There may be a header before the first utterance, but after the first utterance there should only be more utterances. The TRAINS-93 transcripts (available at http://www.cs.rochester.edu/research/trains) are in this format. This type of file is read using the "New" command.

The second type of file stores information in "tree" format. That is, it stores everything necessary to reconstruct the tree. Each node is written out to file as two lines. The first line begins with "<" and ends with ">". In between these two characters, it has a set of "attr=val" pairs. The possible attributes include:

- number – line or utterance number
- id – a unique numerical id for this node
- nucleus – a boolean (true/false) value stating whether this node is a nucleus
- discounted – a boolean (true/false) value stating whether this node is discounted
- parent – the numerical id for the parent of this node. Nodes that are not yet in any relation have parent 0.

The second line contains the text for the utterance, or the relation label(s). A file in "tree" format contains the nodes in depth-first order. Files of this type are read using the "Load" command.

It should be possible to write a simple Perl script that takes most transcripts or texts and puts them in tree format. Simply take each sentence/clause/utterance and add a line before it containing the relevant attribute-value pairs. The first line should be the root of the tree, so the text will be blank, the parent will not be given, and the id will be 0.

Relations

The relation types are fixed; you're going to have four menus plus a content menu no matter what (unless you modify the source code). However, the relations themselves are read from the relevant text files (`adjacent.txt, scheme.txt, content.txt, contentrelations.txt, present.txt, subject.txt`). To alter the relations the tool shows, simply edit these text files.

References

[1] P. Heeman and J. Allen. The TRAINS–93 dialogs. Technical Report Trains TN 94-2, Computer Science Dept., U. Rochester, March 1995.

[2] E. Maier and E. Hovy. Organizing discourse structure relations using metafunctions. In H. Horacek and M. Zock, editors, *New Concepts in Natural Language Generation: Planning, Realization, and Systems*. Pinter, London, 1993.

[3] W. Mann and S. Thompson. Rhetorical structure theory: a theory of text organisation. In L. Polanyi, editor, *The Structure of Discourse*. Ablex, Norwood, NJ, 1987.

[4] M. Moser, J. Moore, and E. Glendening. Instructions for coding explanations: Identifying segments, relations and minimal units. Technical Report 96–17, University of Pittsburgh, Department of Computer Science, 1996.

[5] A. Stent. Rhetorical structure in dialog. In *Proceedings of INLG 2000*, 2000.

A Notes

1. Example comes from [3].
2. Example comes from a TRAINS-93 dialog.
3. Example is similar TRAINS-93 dialogs, but does not come directly from a TRAINS-93 dialog.
4. Example is a paraphrase or simplification of an extract from a TRAINS-93 dialog.