Chapter 7

Disputed Discourse: Argumentation Analysis

In this Chapter...
...an introduction to the field of argumentation analysis

Application of Argumentation Analysis to the Information Mapping Principles

Interconnected
Multivalued
Ambiguous
Considerable Uncertainty

Application of Argumentation Analysis to Ill-Structured Problems

Multiple Points of View
Value Conflicts
Great Constraints
Complicated & Complex
A-logical or illogical

Grounds
Claims
Relations
Rebuttals
Warrants
Backing
Qualifiers

Application of Argumentation Analysis to a Scientific Problem

Overview of This Chapter

Different Kinds of Reasoning Require Different Kinds of Analysis

The British philosopher Stephen Toulmin and the Belgians, Chaim Perelman and L. Olbrechts-Tyteca, have claimed that the reasoning process involved in most discussions about policy, ethics, law, and business strategy is more complex than the three part structure of the classic syllogism (i.e., major premise, minor premise, conclusion). They have suggested a way of capturing the subtleties and overall structure of reasoning processes. In this chapter we focus on the approach of Toulmin.

Definition: Argumentation Analysis

Argumentation analysis is a sentence-by-sentence examination of the components of an argument or a line of reasoning in order to identify the functions performed by the different sentences. This provides a structure of the argument. In the Toulmin version of argumentation analysis the functions are typically listed as in this diagram:

Brief History of Argumentation Analysis

<table>
<thead>
<tr>
<th>Year</th>
</tr>
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<tbody>
<tr>
<td>1955</td>
</tr>
<tr>
<td>1960</td>
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<tr>
<td>1965</td>
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<tr>
<td>1970</td>
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<tr>
<td>1975</td>
</tr>
</tbody>
</table>

- Publication of First Books by Toulmin and Perelman and Olbrechts-Tyteca
- First Survey of the State of the Art of Argumentation Theory (Johnstone)
- Toulmin's Textbook First Published

Chapter 7. Disputed Discourse

Commentary: Plan of This Chapter

Argumentation analysis has a substantial history separate from hypertext. But a number of groups are computerizing it and considering the linked networks of blocks of information to be similar in intent and structure to other hypertext networks. From the standpoint of this book we place argumentation analysis in a position that helps link the two other discourse domains we deal with. We present the following two abbreviated examples of argumentation analysis in this chapter. (REH)

1980

Publication of the First Handbook on Argumentation Analysis by van Eemeren, Grootendorst and Krulger

1985

Early Work on Computer-Based Argumentation Analysis at MIT and Xerox Research

1990

Relatively well-structured problems
The rationale and research underpinning the 4 principles of Information Mapping's method.

Relatively ill-structured problems
A portion of the current dispute over the ethics of using deterrence as a national policy in the era of nuclear weapons.

Toulmin has worked on a structure that would help us study reasoning such as this.

For example, he calls this a “claim,” and this the “grounds” of the argument. And this he designates as the “warrant,” that which enables you to go from the grounds to the claim.

Other parts of his framework include the “backing” which supports the warrant and various rebuttals.

Even if attacked, a superpower should not retaliate with nuclear weapons.

Why do you say that?

Because a large nuclear war could destroy most of the life in the Northern Hemisphere or even our entire species.

But how do you get to your conclusion?

Well, no reason or value is important enough to risk the destruction of our entire species.

How do you justify that conclusion?

Human beings must survive if we are to have any other values at all.

But we don’t know for sure. It’s only a possibility that we would destroy the entire species.
Claims

Introduction

When we begin to examine a policy discussion or an ethical argument, there is always some "destination," some claim that one of the discussants advances.

Definition

Claims are "assertions put forward publicly for general acceptance with the implication that there are underlying 'reasons' that could show them to be 'well founded' and therefore entitled to be generally accepted." (Toulmin, et. al. 1979)

Questions to be asked

What exactly are you claiming?

Where precisely do you stand on this issue?

What position are you asking us to agree to as the outcome of your argument?

Example one: claim as fact

The company is in good financial shape.

Our sales may not be up but we are beginning to sell to the right niche.

Example two: claim as policy proposal

Our best bet is to try to sell to the specialized section of the retail market — the high end.

We should go after international markets rather than put all of our investment in the domestic market.

Example three: claim as forecast

The economy will grow this year at a rate of 3.5 per cent.

Our sales forecast in the retail market is for $25 million.

Form of the sentences

The form of sentences for claims is often one of the following:

- We should follow policy (x).
- We should (or should not) take action (a).
- If we follow policy (x) or action (a), state (s) will follow.
- (x) is a state that exists.
Grounds (Data)

Introduction

As we try to understand why somebody believes something, we may ask them exactly why they are making that claim and what they have to go on. Often their reply is in the form of data or facts that they believe to be true.

Definition

"The term 'grounds' refers to the specific facts relied on to support a giver claim." Toulmin (1979)

Questions to be asked

- What kinds of facts would be sufficient to support this claim?
- What information are you going on?
- On what grounds is your claim based?
- Where must we ourselves begin if we are to see whether we can take the step you propose and so end by agreeing to your claim?

Example one

- We are not doing so well this fiscal year.
- Why do you say that?
- Our sales are flat, and the economy is having a good year.
- These are the grounds in this argument

Form of the sentences

The form of sentences in grounds is often the following:

- Situation (x) exists.
- (x) is a measurement that is (y).
- (x) is a conclusion drawn from the data collection methods we've used.
Warrants

Background.

"Historically speaking," the warrant "has always had close associations with the notion of a license or permit and also with that of a warranty or guarantee." Toulmin (1979)

Definition

The warrant is the assertion that entitles you to interpret or link the grounds (facts) as support for the claim.

Questions to be asked

- Given that starting point, how do you justify the move from these grounds to that claim?
- What road do you take to get from this starting point to that destination?
- What makes this particular set of facts acceptable for the purpose of this specific claim?

Example one

Toulmin (1979) presents the familiar warrant...

I see smoke (grounds).
Smoke means fire (warrant),
therefore, there is a fire (claim).

Example two

We should cut costs next quarter.

When losing money, organizations should cut expenses as much as possible.

The claim

The warrant

The grounds

We've lost money the last 3 quarters.

Types of warrants

Warrants usually "take the form of laws of nature, legal principles and statutes, rules of thumb, engineering formulas," moral commandments or principles.

Form of the sentences

The form of sentences of warrants is often one of the following:

- Situation (s) indicates the presence of condition (c).
- When condition (c) exists, do action (a) to obtain goal (g).
- When situation (s) exists, follow policy (p).
Backing

Introduction

Sometimes we are not satisfied with the mere assertion of the warrant. We want more information. We want to understand why that warrant can hold in this situation.

Definition

"The Backing consists of a very general set of background assumptions which, in effect, legitimate the basis for believing in the Warrant. That is, if the Warrant is not accepted on its surface, then the Backing is called into play to add deeper support to the argument."

(Mitroff and Mason, 1980)

Questions to be asked

- Is this really a safe move to make?
- Does this route take us to the required destination securely and reliably?
- What other general information do you have to back up your trust in this particular warrant?

Example

When losing money, organizations should cut expenses as much as possible.

The warrant:

How do you justify that conclusion?

A business can't continue to lose money and stay in business.

The backing:

Different kinds of backing

"The warrants relied on to authorize arguments in different fields of reasoning require correspondingly different kinds of backing: legal statutes must have been validly legislated; scientific laws must have been thoroughly checked out..."

Toulmin (1979)

Mitroff and Mason (1980) list four types of backing:

1. Cause-effect (given the truth of the evidence, the claim must follow)

2. Analogy (this situation is sufficiently like another to apply the same argument)

3. Belief in authority (someone powerful or credible argues that he or she believes (x) to be the case where (x) is a warrant)

4. Logical necessity (it is logically inconceivable or impossible that the claim would fail to occur given the evidence)
Rebuttal

Introduction

Rarely are we faced with an "airtight" situation or argument. Therefore, we need to know under what circumstances the current argument might not work.

Definition

The rebuttal presents the possible exceptions or objections as to why the claim, the grounds, the warrants, or the backing may not hold for the situation under discussion.

Questions to be asked

1. What kinds of factors or conditions could throw us off the road?
2. What possibilities might upset this argument?
3. What assumptions are we implicitly relying on in this argument?
4. Is the data really relevant to this claim?
5. Does the warrant really apply to this case?
6. Can the claim be derived via the warrant even if the data are assumed to be valid?

Example

That may be true in general, but not with our customers. Besides that, times have changed; the economy has changed; the dollar has fallen in value.

Types of rebuttal

There are several types of rebuttal:

1. Grounds. The facts are wrong (Situation (s) is not the case.).
2. Warrants. The warrant does not apply.
   (The warrant is wrong. E.g., do something else.)
3. Backing. False analogy or false belief.
4. Claims. We should take action B, not action A.
   (Situation (s) is not the case, so do some other action that is not-A.)

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Qualifiers

Introduction

Every argument has a degree of certainty. We often refer to the limits of an argument. We cite its plausibility or degree of certainty.

Definition

Qualifiers are those words that indicate how strongly the claim is being asserted, or how likely that something might occur.

Examples of qualifiers

Here are some qualifiers that one frequently encounters in arguments:

- presumably
- very likely
- in all probability
- always
- certainly
- very possibly
- plausibly

Questions to be asked

Are you making this claim unconditionally and without qualification?

Are you saying that this is certain or that it is likely, very likely, or quite certainly the case?

Does this absolutely guarantee this step?

Example

So the reason for the problem is quite probably in the way the new policy was implemented.
Argumentation Analysis for Four Principles

Application: Some Principles of Information Mapping's Method

We present on this page an analysis of the rationale for using the four principles that we have claimed to be the foundations of Information Mapping's methodology. We use the argumentation analysis methodology presented in this book as a framework for presenting this rationale.

1. Chunking Principle (Information Mapping)
   Group all information into small, manageable units, information blocks, and information maps.

General Chunking Principle
   "We must organize our thought processes so they do not require us to hold more than 4 to 7 chunks in short term memory simultaneously." (Simon, 1979)

Grounds
   All human beings naturally chunk information as a part of their short term memory process.
   Pre-chunking aids learning. (Miller, 1967. Simon, 1979)

If it works across several types of human information processing, then it should work across the types coded in text, graphics, and combinations of them in each document that we create.
Four Principles of Information Mapping

Claim

3. Relevance Principle (Information Mapping)

Include in one chunk only information that relates to one main point based on that information's purpose or function for the reader.

Claim

4. Consistency Principle (Information Mapping)

For similar subject matters, use similar words, labels, formats, organizations, and sequences.

Supports

Thus supports

Grounds

Gedanken Experiment A

Think of an experiment where we deliberately and randomly mislabel chunks of information.

Prediction: Tests of speed and error rate in retrieval would be slower for mislabeled information than for systematically labeled group.

Summary of Research

"For any particular type of data display, maintain consistent format from one display to another... For displayed data and labels, choose words carefully and then use them consistently... Ensure that wording is consistent from one display to another." (Smith and Mosier, 1986; see also Stewart, 1980, Pakin and Wray, 1982)

Grounds

see Jonassen experiment (1982) and Shafer (1982)

Comment

Also indirect evidence from the six dissertations with experimental data done on the whole methodology although the factors of relevancy and consistence were not specifically isolated and controlled in the experiments.

Note

In the grounds blocks we have typically provided descriptions of one or more papers. Usually there is further research that supports these claims. The reader may consult other sources provided in the bibliography.

Argumentation Analysis for Three More Principles

Application: Information Mapping's Method

On the previous pages, we have presented an argumentation analysis framework supporting the four basic principles that we used to construct all information blocks. We present on this page three more principles that we used to guide development decisions in formulating Information Mapping's methodology. We use the argumentation analysis methodology presented in this book as a framework for presenting this rationale.

Claim

Hierarchy of Labeling and Chunking Principle (Information Mapping)

Organize all small, relevant units of information into a hierarchy and provide the larger group(s) with label(s).

Grounds

Chunking Research


Claim

Integrated Graphics Principle (Information Mapping)

Use diagrams, tables, pictures, etc. as an integral part of the text, not as an afterthought added on when the writing is complete.

Grounds

Hierarchy Research

Readers construct hierarchical representations of the text they read. (Van Dijk and Kintsch, 1983).

Grounds

Survey of graphic research literature (MacDonald-Ross and Smith, 1977, Smith & Mosier, 1986).

Three More Principles of Information Mapping

Claim
Accessible Detail Principle
(Information Mapping)
Present detail to support abstractions in a manner that makes it readily accessible to users. Put examples and diagrams close to the text they illustrate.

thus
supports

Claim
If you do not provide detail, people will naturally fill in the detail from their own experiment, quite likely incorrectly.

thus
supports

Grounds
All language is ambiguous. There are 14,070 meanings for the 500 most frequently used words in the English language. (Horn, 1967)

People "fill in" detail from their own experience when given abstractions in communication situations. They generally believe that their "filled in examples" are correct without further consideration. (Bandler and Grinder, 1975, provide one summary of this research)
Useful in Representing Ill-Structured Problems

Introduction
Only recently have researchers begun to study what can be called ill-structured problems, problems that defy easy definition and boundaries, and have little consensus as to their nature.

Definition: Ill-Structured Problems
Ill-structured problems are those about which different people have very different perceptions and values concerning their nature, their causes, their boundaries, and their solutions. They are the problems that bring out two or more points of view from the first mention of them.

Definition: Well-Structured Problems
Well-structured problems are textbook problems, problems which are most often used in training of scientists and engineers. There is widespread consensus as to their nature. They are logically coherent and consistent.

Characteristics
Ill-structured problems exhibit many of the characteristics shown on these pages.
Commentary: Visual Structure

On this page I tried to illustrate visually how difficult it is to comprehend an ill-structured problem. I did that by making the visual elements very tangled and disorderly. I hope you get the "feel" of what I am trying to convey about ill-structured problems from this visual device. (REH)
Case Study of a Poorly-Structured Problem

Introduction

We present on the following pages the basic arguments that were argued in the 1980's over the ethics of the policy of nuclear deterrence to illustrate the application of argumentation analysis to ill-structured problems.

**Chart 1. Deterrence - An Immoral Policy**

The current debate about nuclear ethics is focused in large part on a re-examination of the policy of deterrence. For some people, threatening to use nuclear weapons is an immoral policy. For others, it is the only moral position. With such contradictory positions, we can identify nuclear ethics as an ill-structured problem and apply the tools of argumentation analysis to it.

**Claim**
Any threat to use nuclear weapons is immoral. No moral country will use such threats.

- Agree □ No □ Not Sure
- Who makes claim?

**Grounds**
Threatening to use nuclear weapons even with the purpose of preventing their use -- depends on the possibility that they might actually be used -- i.e., that the threat will be carried out.

- Agree □ No □ Not Sure
- See chart

**BUT**

**Key**
- Indicates Rebuttal
- Indicates Support

**Rebuttal (Counterclaim):**
Deterrence is moral because it is the best policy we have to prevent the use of nuclear weapons.

- Agree □ No □ Not Sure
- Who makes claim?

**Grounds**
See page 2

**Key**
- See chart

Chapter 7. Disputed Discourse

Definition

Nuclear Deterrence

1. a condition of the modern age of nuclear powers such that each superpower realizes that, if they started a nuclear war, the other superpower has sufficient invulnerable weapons to retaliate and potentially destroy their military forces, culture and cities. 2. any policy of a nuclear nation that tends to promote or continue the condition of nuclear deterrence. It is a policy in which both superpowers think: "We will not start a nuclear war because the other side threatens to retaliate and destroy us and we think they could and would do that."

Who Makes This Claim?

"It makes no sense to reject deterrence simply because it may not be infallible; it makes sense to reject it only if it proves more dangerous than the alternatives."

—Charles Krauthammer

Who Makes This Claim?

The Bishops of the United Methodist Church said in their pastoral letter (1986): "We have said a clear and unconditional 'no' to nuclear war and to any use of nuclear weapons. We have concluded that nuclear deterrence is a position which cannot receive the church's blessing...the ideology of deterrence must not receive the churches' blessing, even as a temporary warrant for holding on to nuclear weapons. The lingering possession of such weapons for a strictly limited time requires a very different justification: an ethic of reciprocity as nuclear-weapon states act together, in agreed stages, to eliminate their nuclear weapons."
Case Study Brings Together Opposing Viewpoints

Introduction
These two pages are a continuation of the basic arguments that were argued in the 1980’s over the ethics of the policy of nuclear deterrence to illustrate the application of argumentation analysis to ill-structured problems.

Definition

Deterrence prevents war; therefore it is the only morally acceptable policy.
The counterclaim of the immorality of deterrence is that deterrence is moral. The argumentation analysis outlining the main structure of this argument is presented on this page.

Chart 2.

Rebuttal

Deterrence has too many risks in the face of the possibilities of inadvertent outbreak of nuclear war.

- Agree No Not Sure
- Who makes claim? see chart

Claim

Deterrence is moral because it is the best policy we have to prevent the use of nuclear weapons.

- Agree No Not Sure
- Who makes claim? see chart

Thus

supports

Pragmatic Argument for Deterrence Policy

Before throwing out what has worked to keep the peace and prevent nuclear war, you must come up with a better moral alternative. Otherwise it is morally better to keep the policy you have.

- Agree No Not Sure see chart

Deterrence is less dangerous than its alternatives.

Deterrence may not be perfect as a policy but it is less dangerous than its alternatives.

- Agree No Not Sure see chart

Grounds

Deterrence prevents nuclear war by making both sides afraid of starting a war because they will surely lose more than they could possibly gain and could conceivably completely destroy their own country.

- Agree No Not Sure see chart

The policy of deterrence has worked for 40 years. Since 1945 there has been no nuclear war and no conventional war between superpowers.

- Agree No Not Sure see chart

Key

Indicates Rebuttal
Indicates Support
Chapter 7. Disputed Discourse

Who Makes This Claim?

"Nuclear war is such an emotional subject that many people see the weapons themselves as the common enemy of humanity. Nuclear weapons are intrinsically neither moral nor immoral, though they are more prone to immoral use than most weapons. But they can be used to accomplish moral objectives and can do this in ways that are morally acceptable. The most obvious and important way is to use them or their availability to deter others from using nuclear weapons. The second -- of much lower, but still significant priority -- is to use them to help limit the damage (human, social, political, economic, and military) that could occur if deterrence fails. Anything that reduces war-related destruction should not be considered altogether immoral."

-- Herman Kahn

Thinking About the Unthinkable

By Herman Kahn

for other quotes

Comparing Ill-Structured and "Tame" Problems

Introduction.
Ill-structured problems can best be seen if we look at them in comparison with "tame" or "well structured" problems, as in the chart below.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Tame Problems</th>
<th>Ill-Structured Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability to formulate the problem</td>
<td>Can be formulated exhaustively and written down definitively.</td>
<td>No definitive formulation</td>
</tr>
<tr>
<td>Ability to devise and conduct</td>
<td>Can be tested. Mistakes and errors can be identified.</td>
<td>No single criterion to determine correctness. Difficult to determine when a solution is a solution or even whether a test is applicable.</td>
</tr>
<tr>
<td>definitive tests</td>
<td></td>
<td>appropriate test?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>is this the best boundary?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>only or best alternatives?</td>
</tr>
<tr>
<td>Relationship between problem and</td>
<td>Problems can be formulated separately from solutions.</td>
<td>Solving the problem is synonymous with understanding it in the first place.</td>
</tr>
<tr>
<td>solution</td>
<td></td>
<td>Each formulation of an ill-structured problem contains a definition of the solution.</td>
</tr>
</tbody>
</table>

### Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Tame Problems</th>
<th>Ill-Structured Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability to determine whether problem has been solved</td>
<td>Have a clear ending point and a determinable solution.</td>
<td>No stopping criteria... the problem may be ongoing and continuously changing, so there is no way of determining completion.</td>
</tr>
<tr>
<td></td>
<td><img src="image1.png" alt="Diagram" /></td>
<td><img src="image2.png" alt="Diagram" /></td>
</tr>
<tr>
<td></td>
<td>A clear rule or test can be stated to determine completion.</td>
<td></td>
</tr>
</tbody>
</table>

### Tractability

<table>
<thead>
<tr>
<th>Step</th>
<th>Procedure</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
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<tr>
<td>2</td>
<td></td>
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<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

Exhaustive list of operations used to solve problem exists.

No list of operations exists for solving ill-structured problems.

### Relationship between explanation and solution

Can be stated as a discrepancy between what is and what could or ought to be, and an explanation exists for every gap.

Many possible explanations and each one "contains" or "implies" a different solution.

More on this table on next page
Comparing Ill-Structured and "Tame" Problems

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Tame Problems</th>
<th>Ill-Structured Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uniqueness or reproducibility of problem</td>
<td>Problems can be abstracted from the real world and similar solutions can be found.</td>
<td>Each problem and each solution is unique.</td>
</tr>
<tr>
<td></td>
<td><img src="image1.png" alt="Diagram of Tame Problem Solution" /></td>
<td><img src="image2.png" alt="Diagram of Ill-Structured Problem Solution" /></td>
</tr>
<tr>
<td>Repeatability of solutions</td>
<td>Attempts to solve can be made repeatedly until one works.</td>
<td>You cannot undo what you have tried, so that each solution is unique and changes the nature of the problem.</td>
</tr>
<tr>
<td></td>
<td><img src="image3.png" alt="Diagram of Tame Procedure" /></td>
<td><img src="image4.png" alt="Diagram of Ill-Structured Procedure" /></td>
</tr>
<tr>
<td>Level of analysis</td>
<td>Identifiable, &quot;natural&quot; form with high degree of certainty...level of detail for solving the problem can be found...and boundaries for the problem are reasonably easy to agree upon.</td>
<td>No identifiable causes...every &quot;symptom&quot; is a problem and vice versa...level of detail and approach are not easy to define...little agreement on setting boundaries of the problem.</td>
</tr>
<tr>
<td></td>
<td><img src="image5.png" alt="Diagram of Tame Level of Detail" /></td>
<td><img src="image6.png" alt="Diagram of Ill-Structured Level of Detail" /></td>
</tr>
</tbody>
</table>
Conclusions: Argumentation and Hypertext

Summary

Argumentation is a different kind of discourse from relatively stable subject matter. We have seen in this chapter that it is useful to clarify the components of a disagreement by identifying exactly what the claims, grounds, warrants, etc., are. And it is useful to use a more graphic way of displaying these components.

Connection With Other Types of Discourse

How does argumentation analysis relate to the other major types of discourse we have presented in this book? On this page we show the major connections with other types of discourse discussed in this book.

Commentary: Usefulness of Argumentation Analysis

It is quite possible that argumentation analysis, as described in this chapter, will provide a method for slowing down disputes and looking very carefully at the merits of different points of view. Obviously, many disputes can be conducted without it. In other disputes we will be able to use argumentation analysis as a kind of "microscope" to look at the argument quite closely for any flaws or weaknesses. For that, it will become a significant tool. (REH)
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