Argumentation in Artificial Intelligence, With Applications in the Law

Course at the Institute of Logic and Cognition, Sun Yat-Sen University

IIa: Argument Schemes and Argumentation Dialogues

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IA   Introduction
IB   Abstract Argumentation, Argument Structure

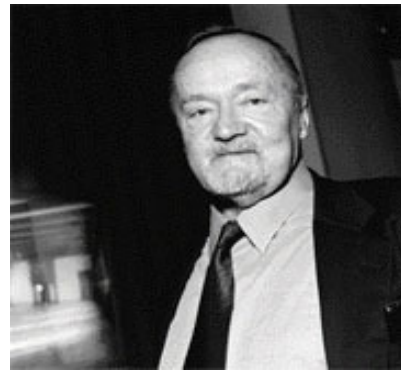**IIa: Argument Schemes and Argumentation Dialogues**

Topics:
    Argument Schemes
    Argumentation Dialogues

Goals:
    Understand the nature and role of argument schemes
    Understand the nature and role of argumentation dialogues

Literature:
    Van Eemeren et al. (in preparation). Sections 11.6, 11.7.

Main themes of Toulmin (1958)

1. Argument analysis involves half a dozen distinct elements, not just two.
2. Many, if not most, arguments are substantial, hence defeasible.
3. Standards of good reasoning and argument assessment are non-universal.
4. Logic is to be regarded as generalised jurisprudence.

The Uses of Argument
Stephen Toulmin
Updated Edition
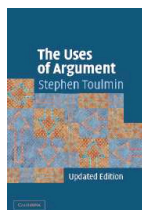
Toulmin on logic

Logic as psychology
    Laws of thought, normal and abnormal (descriptive)
Logic as sociology
    General habits and practices, not individual (descriptive)
Logic as technology
    Recipes for rationality, rules of a craft, an art, like medicine (normative)
Logic as mathematics
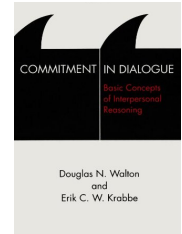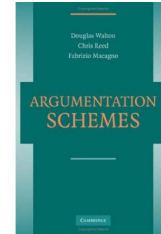   Formal relations, no connection to thinking (objective)
Logic as jurisprudence
    Critical, procedural function, from idealised to working logic

Toulmin on logic as jurisprudence

If the same as has long been done for legal arguments were done for arguments of other types, logic would make great strides forward. (255/235)

Walton

Walton & Krabbe around 1990

From the NIAS web site, where *Commitment in Dialogue* was conceived.

Classes of specific reasons

(1) Deductive reasons
(2) Perception
(3) Memory
(4) Statistical syllogism
(5) Induction

Pollock 1995, *Cognitive Carpentry*

(1) P. If P then Q.
Therefore Q.

(2) All Ps are Qs. Some R is not a Q.
Therefore some R is not a P.

Argument schemes

(3) Person E says that P. Person E is an expert with respect to the fact that P.
Therefore P.

(4) Doing act A contributes to goal G. Person P has goal G.
Therefore person P should do act A.

Argument schemes

Argument schemes are

- context-dependent, not universal,
- defeasible, not strict, and
- concrete, not abstract.

Are argument schemes hence a useless tool of analysis?

No: take inspiration from knowledge engineering

Critical questions

Argument scheme for witness testimony:

Witness A has testified that P.
Therefore: P

Critical questions, for instance:

Wasn't A mistaken?
Wasn't A lying?

Walton on Argument schemes

The *Ad hominem* fallacy:
attack an opponent instead of the argument made

Walton on Argument schemes

Generic AH
a is a bad person.
Therefore, a's argument A should not be accepted.

-> a semi-formal rule of inference

Walton on Argument schemes

Guilt By Association AH
a is a member of or is associated with group G, which should be morally condemned.
Therefore, a is a bad person.
Therefore, a's argument A should not be accepted.

-> a small semi-formal derivation

Walton on Argument schemes

Two Wrongs AH
Proponent: Respondent, you have committed some morally blameworthy action (and the specific action is then cited).
Respondent: You are just as bad, for you also committed a morally blameworthy action (then cited, generally a different type of action from the one cited by the proponent but comparable in respect of being blameworthy). Therefore, you are a bad person, and your argument against me should not be accepted as having any worth.

-> a small argumentative dialogue

Walton on Argument schemes

Note that **Generic AH** occurs in **Guilt By Association AH** and **Two Wrongs AH** (literally in the former, and with a minor adaptation in the latter).

Walton on Argument schemes

Argument schemes come with <u>critical questions</u>, e.g., for **Generic AH**:

CQ1 Is the premise true (or well supported) that a is a bad person?

CQ2 Is the allegation that a is a bad person relevant to judging a's argument A?

CQ3 Is the conclusion of the argument that A should be (absolutely) rejected even if other evidence to support A has been presented, or is the conclusion merely (the relative claim) that a should be assigned a reduced weight of credibility, relative to the total body of evidence available?

Conclusions about Walton's approach

- The specifications are much looser than in formal logic
- Use of the schemes requires interpretation
- For Walton's goal, the analysis and evaluation of real arguments, this is not problematic, even right on the mark

Can't Walton's approach be further systematized?
Hypothesis: it can.

Idea:
approach the specification of Argument schemes as a *knowledge engineering* task, thereby finding a semi-formal middle-way between the formal and the informal

A format for Argument schemes

Consequent:	*P*.
Antecedent:	Person *E* says that *P*.
	Person *E* is an expert with respect to facts like *P*.
Exception:	Person *E* is lying.
Condition:	Experts with respect to the facts like *P* provide reliable information concerning the truth of *P*.

Critical questions

1. Critical questions concerning the <u>consequent</u> of an Argument scheme.
   Are there other reasons, based on other Argument schemes for or against *P*?
2. Critical questions concerning the elements of the <u>antecedent</u> of an Argument scheme.
   Did person *E* say that *P*? Is person *E* an expert with respect to facts like *E*?
3. Critical questions based on the <u>exceptions</u> of an Argument scheme.
   Is person *E* lying?
4. Critical questions based on the <u>conditions of use</u> of an Argument scheme.
   Do experts with respect to the facts like *P* provide reliable information concerning the truth of *P*?

Developing a set of Argument schemes

1. Determine the relevant <u>types of sentences</u>
2. Determine the <u>conditional relations</u>, i.e., the antecedents and consequents of the Argument schemes
3. Determine the <u>exceptions</u>, i.e, the arguments against the use of the Argument schemes
4. Determine the <u>conditions of use</u> for the Argument schemes

   (Not necessarily in this order and perhaps sometimes going back to earlier steps)

The systematic specification of semi-formal argument schemes can be regarded as fulfilling a proposal made by ...?
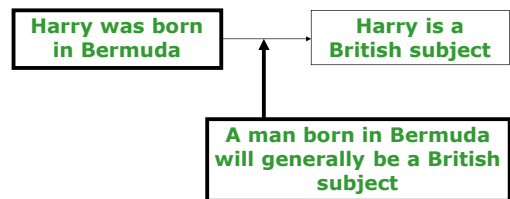

Main themes of Toulmin (1958)

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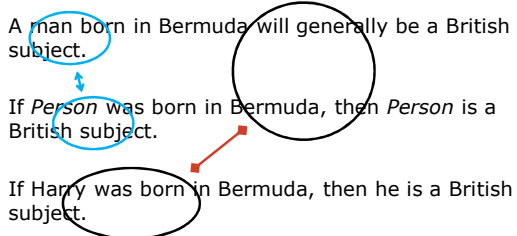4. Logic is to be regarded as generalised jurisprudence.

Warrant

Harry was born in Bermuda → Harry is a British subject
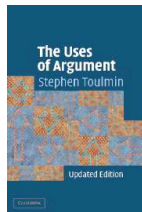
A man born in Bermuda will generally be a British subject

Warrants

are closely related to

argument schemes.

Warrant

$$\frac{W \qquad W \sim> (D \sim> C)}{\frac{D \qquad D \sim> C}{C}}$$

D: Harry was born in Bermuda.
C: Harry is a British subject.
W: A man born in Bermuda will generally be a British subject.

Warrant, generalized conditional, specific conditional

A man born in Bermuda will generally be a British subject.

If *Person* was born in Bermuda, then *Person* is a British subject.

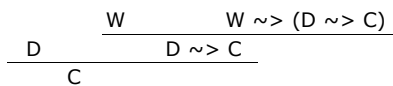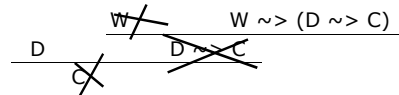If Harry was born in Bermuda, then he is a British subject.

From warrant via generalized conditional to argument scheme

A man born in Bermuda will generally be a British subject.

If *Person* was born in Bermuda, then *Person* is a British subject.

Person is born in Bermuda.
Therefore: *Person* is a British subject

Warrant

$$\frac{W \qquad W \sim> (D \sim> C)}{\dfrac{D \qquad D \sim> C}{C}}$$

D: Harry was born in Bermuda.
C: Harry is a British subject.
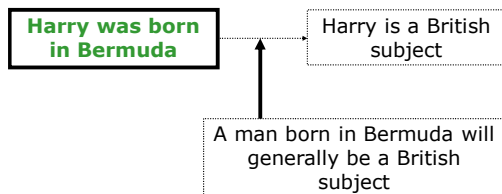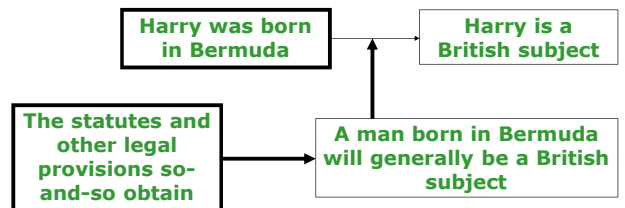W: A man born in Bermuda will generally be a British subject.

DefLog Verheij 2003

Warrant

$$\frac{\cancel{W} \qquad W \sim> (D \sim> C)}{\dfrac{D \qquad \cancel{D \sim> C}}{\cancel{C}}}$$

D: Harry was born in Bermuda.
C: Harry is a British subject.
W: A man born in Bermuda will generally be a British subject.

DefLog Verheij 2003

Warrant

Backing

Backing

$$\frac{\begin{array}{cc} B & B \sim> W \end{array}}{W} \qquad W \sim> (D \sim> C)$$
$$\frac{\begin{array}{cc} D & D \sim> C \end{array}}{C}$$

B: The statutes and other legal provisions so-and-so obtain.
W: A man born in Bermuda will generally be a British subject.
B ~> W: If the statutes and other legal provisions so-and-so obtain, a man born in Bermuda will generally be a British subject.

Remarks on nesting

1. In the diagrams, the nesting of the conditionals passes almost unnoticed.

2. Logically, nesting can be as deep as deemed appropriate.

3. "Epistemologically", there is presumably not much need for deep nesting.

On to dialogues!

Walton & Krabbe's dialogue types

Type of dialogue	Initial situation	Participants' goal	Goal of dialogue
persuasion	conflict of opinions	persuade other party	resolve or clarify issue
inquiry	need to have proof	find and verify evidence	prove (disprove) hypothesis
discovery	need to find an explanation of facts	find and defend a suitable hypothesis	choose best hypothesis for testing
negotiation	conflict of interests	get what you most want	reasonable settlement both can live with
information-seeking	need for information	acquire or give information	exchange information
deliberation	dilemma or practical choice	co-ordinate goals and actions	decide best available course of action
eristic	personal conflict	verbally hit out at opponent	reveal deeper basis of conflict

Prakken's four layers

The logical layer
  Contradiction and support

The dialectical layer
  Attack, counterargument, defeat

The procedural layer
  Moves, dialogue rules, turn taking

The strategic layer
  Heuristics, effective argumentation

Hage on dialogue models in the law

Reasons why dialogue models popular for law:
1. Legal reasoning is defeasible.
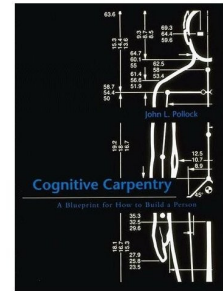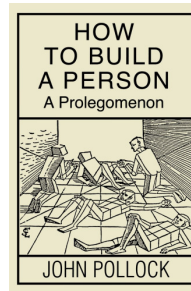2. The law is an open system, and is established in concrete cases.

Functions of dialogues in the law:
1. Defining argument justification ('battle of argument' models)
2. Establishing shared premises
3. Establishment of the law in a concrete case

Note

Not everyone uses
dialogue models
to study
defeasible argumentation

John L Pollock

Note

Not everyone uses
dialogue models
to study
defeasible argumentation

Why not?

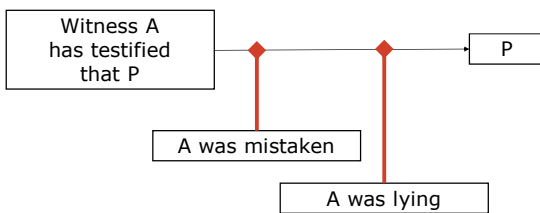## Argument schemes & critical questions

Argument scheme for witness testimony:

Witness A has testified that *P*.
Therefore: *P*

Critical questions, for instance:

Wasn't A mistaken?
Wasn't A lying?

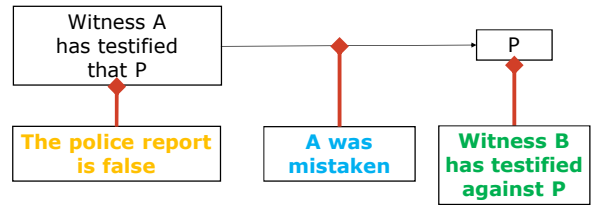## Argument attack & critical questions

Wasn't A mistaken?
Wasn't A lying?

Bonskeid 2000

Kinds of attack, kinds of critical questions

| Witness A has testified that P | → | P |

The police report is false

A was mistaken

Witness B has testified against P

Wasn't the police report false?
Was A not mistaken?
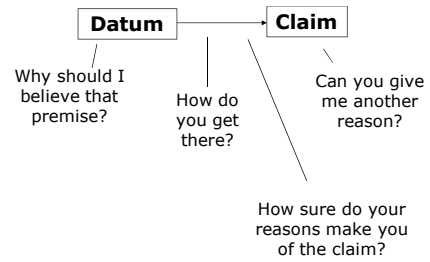**Was there no testimony against P?**

Toulmin & Freeman on arguments in a dialogue

Why should I believe that premise?

Why is that reason relevant to the claim? How do you get there?
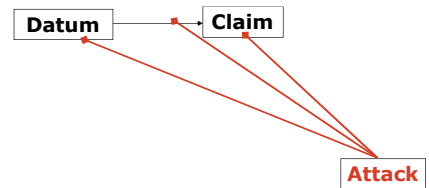
Can you give me another reason?

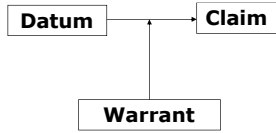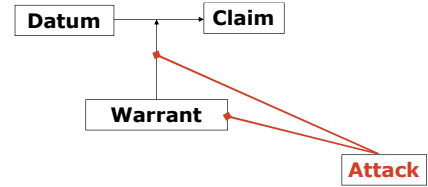How sure do your reasons make you of the claim?

Datum → **Claim**

Why should I believe that premise?

How do you get there?

Can you give me another reason?

How sure do your reasons make you of the claim?

Attack

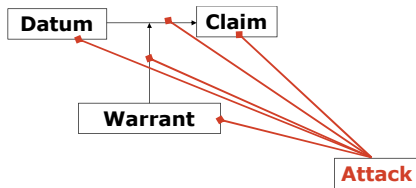**Datum** → **Claim**

Attack

Datum   **Claim**

Attack

Attack

Attack

Attack

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