

Computational Argumentation — Part III

Basics of Argumentation

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Outline

- I. Introduction to computational argumentation
- II. Basics of natural language processing
- III. Basics of argumentation**
- IV. Applications of computational argumentation
- V. Resources for computational argumentation
- VI. Mining of argumentative units
- VII. Mining of supporting and objecting units
- VIII. Mining of argumentative structure
- IX. Assessment of the structure of argumentation
- X. Assessment of the reasoning of argumentation
- XI. Assessment of the quality of argumentation
- XII. Generation of argumentation
- XIII. Development of an argument search engine
- XIV. Conclusion

- Introduction
- Argumentative language
- Argumentative units and arguments
- Argumentation and debate
- Logic, rhetoric, and dialectic
- Conclusion

Learning goals

▪ Concepts

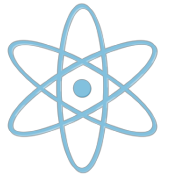
- Understand what argumentation is, why we argue, and how we argue.
- See what linguistic concepts argumentation builds upon.
- Get to know the main concepts related to argumentation.
- Learn to use and distinguish argumentation-related terms properly.



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▪ Associated research fields

- Linguistics
- Argumentation theory
- Rhetoric



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▪ Within this course

- Basics needed for understanding what is analyzed and generated in computational argumentation.



Introduction

Need for debate?

iphone vs galaxy **death penalty** **skolstrejk för klimatet**
article 13 **trump** **silk road** **maduro**
coal phase-out **affirmative action** **basic income** **feminism**
refugees **arm exports** **equal pay** **annexation of crimea**
#metoo **lying press** **golan heights**
messi vs ronaldo **tuition fees** **western arrogance**
whatsapp **democracy**

Controversial issues

▪ Controversy

- A question (problem) without a clearly correct answer (solution).
- A potential conflict of standpoints on a given issue.

”Controversy is an essential prerequisite of debate. Where there is no clash of ideas, proposals, interests, or expressed positions on issues, there is no debate.“

(Freeley and Steinberg, 2009)

▪ Examples

Controversial.

Feminism is needed.

Non-controversial.

2 plus 2 equals 4.

Borderline case.

The earth is a sphere.

▪ Issue

- A topic is a subject, matter, or theme, such as *”feminism“*.
- An issue is a topic at discussion.
- Issues are usually phrased as claims, such as *”Feminism is needed“*.

Argumentation: a compressed definition

”Argumentation is a verbal, social, and rational activity aimed at convincing a reasonable critic of the acceptability of a standpoint by putting forward a constellation of propositions justifying or refuting the proposition expressed in the standpoint.“

(van Eemeren and Grootendoorst, 2004)

What is argumentation? based on Stede and Schneider (2018)

”Argumentation is a verbal, social, and rational activity aimed at convincing a reasonable critic of the acceptability of a standpoint by putting forward a constellation of propositions justifying or refuting the proposition expressed in the standpoint.“

(van Eemeren and Grootendoorst, 2004)

▪ **A verbal activity**

- Argumentation is inherently linguistic, either in spoken or in written form.
Mimics, gestures, and other forms of communicating are secondary.

▪ **A social activity**

- Argumentation is an interaction with two or more opposing participants.
Notice that one may also argue with oneself.

▪ **A rational activity**

- The core of argumentation is to exchange reasonable arguments.
Other facets of arguing such as rhetoric may still play a role, though.

Why to argue? based on Stede and Schneider (2018)

”Argumentation is a verbal, social, and rational activity aimed at convincing a reasonable critic of the acceptability of a standpoint by putting forward a constellation of propositions justifying or refuting the proposition expressed in the standpoint. “

(van Eemeren and Grootendoorst, 2004)

- **A standpoint (aka stance)**

- Arguments support (or oppose) a pro or con view on a controversial issue.

Without controversy, there is no disagreement and, hence, no reason to argue.

- **Convincing of acceptability**

- Arguments aim to make opponents accept one’s own view.

Arguments are not about finding truth, because truth is not always not known and not always accessible.

- **A reasonable critic**

- Arguments can be judged within a given social context.

In many cases, the judges will be the participants themselves.

How to argue? based on Stede and Schneider (2018)

”Argumentation is a verbal, social, and rational activity aimed at convincing a reasonable critic of the acceptability of a standpoint by putting forward a constellation of propositions justifying or refuting the proposition expressed in the standpoint.“

(van Eemeren and Grootendoorst, 2004)

▪ **A constellation of propositions**

- Argumentation creates sequential and hierarchical relations between a set of selected propositions.

Concrete arguments are phrased linearizations of these relations.

▪ **Justifying or refuting proposition of the standpoint**

- Argumentation aims to clarify why a standpoint is right (or wrong).

It is not just about social power relationships between the involved participants.

Argumentation at different granularity levels

Alice. *Some people say refugees threaten peace, as many of them were criminals. In fact, Spiegel Online just reported results from a study of the federal police about numbers of refugees and crimes: Overall, there is no correlation at all! Rather, the police confirmed that the main reason for committing crime is poverty. So, if you believe the police then you shouldn't believe those people. Syrians are even involved less in crimes than Germans according to the study. So, the more Syrians come to Germany, the more peaceful it gets there, right?*

Bob. *The question is here why should I believe the police!? Argument failed :P*

Argumentative discourse unit

Argument

Argumentation (monological)

Debate (dialogical argumentation)

Argumentative language

Subjective language based on Stede and Schneider (2018)

▪ Public and private states

- **Public.** A person's actions can be observed by the outside world.
- **Private.** A person's current mental state (what is thought, felt, ...) cannot.

▪ Objective and subjective language

- **Objective.** Some statements of a person describe public states in the world. Listeners can judge them as true or false.

There is a cat on the mat.

Winston Churchill came to office in 1940.

- **Subjective.** When a private state is revealed, such judgments do not apply. Only, we may like or dislike a respective statement.

That's a really bad wine.

I guess that's a llama over there.

▪ Notice

- Objections to a subjective statement rather target the expressed content.
- Without linguistic indicators, subjectivity is often not apparent.

Types of subjective statements based on Stede and Schneider (2018)

▪ Sentiment

- Statements that express positive or negative polarity/valence.
- **Opinion.** An evaluation directed towards an object, idea, ...
- **Judgment.** An evaluation of a *person's* behavior, character, appearance, ...
- **Emotion.** An expression of happiness, fear, sadness, ...

Opinion.

That's a really bad wine.

Emotion.

Hooray!

Judgment.

You don't deserve the price.

▪ Belief in truth

- Statements that focus on the truth or falsity of propositions.
- **Prognosis.** An expectation about the future.
- **Speculation.** An assumption about the past, present, or future.
- **Claim.** An assertion that a certain *stance* on an issue is true (or false).

Claim.

We need feminism.

Speculation.

I guess that's a llama over there.

Prognosis.

There will be snow later.

Stance

■ Stance

- The overall position held by a person towards some target, such as an object, statement, or issue.

Near-synonyms: Viewpoint, view, standpoint, stand, position.

- To have/take a stance on a target means to be *pro* or *con* towards it.

Stance may indicate a perspective (e.g., *liberal*), but it is not the perspective.



Con towards death penalty.

The death penalty must be abolished.

Pro towards the left claim.

It doesn't deter people from violence.

■ Stance vs. claim

- Some literature equates a stance with a claim.
- In fact, a claim is a statement that conveys a stance towards a target.

■ Observations on stance

- Often but not necessarily conveys sentiment.
- Depends on what a speaker claims to be true.
- Can be expressed without naming the target.

Con towards death penalty.

Human life is invaluable.

Verifiability, evidence, and reasons

▪ **Verifiability of claims** (Park and Cardie, 2014)

- **Verifiable-public.** Claims that can be verified based on public evidence.

I tell you Winston Churchill came to office in 1940. I saw it on Wikipedia!

- **Verifiable-private.** Claims that can be verified based on evidence from the speakers private state or personal experience.

I have a headache. Maybe I had too much wine last night.

- **Non-verifiable.** Claims that cannot be verified with objective evidence, but where still a reason can be given.

I don't like this wine, because it has so much tannin.

▪ **Evidence vs. reasons**

- **Evidence.** An answer to *what* is known or *when* something happened.
- **Reason.** Any answer to *why* a statement is supposed to be true (or false).

Types of evidence

▪ Common types of evidence

- **Testimony.** Reference to a proposition made by some expert, authority, ...

D. Tutu said, to take a life when a life has been lost is revenge, it is not justice.

- **Statistics.** A report of results from quantitative research, studies, ...

A survey by the UN from 1998 gave no support for the deterrent hypothesis.

- **Anecdote.** Personal experience, a concrete example, a specific event, ...

I heard about a guy who was proven innocent one day after his execution.

▪ Observations

- Other statements may be seen as evidence, such as an analogy or causality.
- Evidence is often backed up by a reference to sources.
- Conflicting studies exist about what evidence type is most persuasive.

Causality and communicative effects

▪ Causality ("A because B")

- Using causality in language may have different communicative effects.
- In argumentation, it may be used for persuasion or justification.

▪ Communicative effects of causality

- **Persuasion.** A claim *A* is supported by a reason *B*.

Using airplanes is bad because they are among the worst air polluters we have.

- **Justification.** *A* is a possibly controversial attitude or action, *B* the reason for it.

I need to use airplanes a lot because my job requires me to be in different parts of the country every week.

- **Explanation.** *A* is an "undisputed" fact, and *B* is the reason why *A* holds.

An airplane is able to take off because the shape of the wings produces an upward force when the air flows across them.

Discourse modes and communicative functions

▪ Discourse mode

- The communicative function of a continuous text or speech passage.
- The function is partly determined by the types of *discourse entities* mentioned (states, events, facts, assertions, generalizations).

▪ Common typology of discourse modes (Smith, 2003)

- **Narrative.** States and time-related events are introduced, time progresses.
- **Description.** States and ongoing or atelic events, spatial relations.
- **Report.** States and events are introduced, not related relative to each other.
- **Information.** Facts, assertions, and generalizations are introduced.
- **Argument.** Atemporal introduction and relation of states, facts, and assertions.

My sister landed in NY at midnight and then moved on to her hotel. (narrative)

People occupied her way. In front of them, a speaker was standing. (description)

My sister visited the new exhibition yesterday. (report)

The Guggenheim is a famous museum. It's named after its founder. (information)

Discourse structure

- **Discourse structure**

- The representation of the organization of an entire text.
- Coherence relations exist between the contents of text segments.

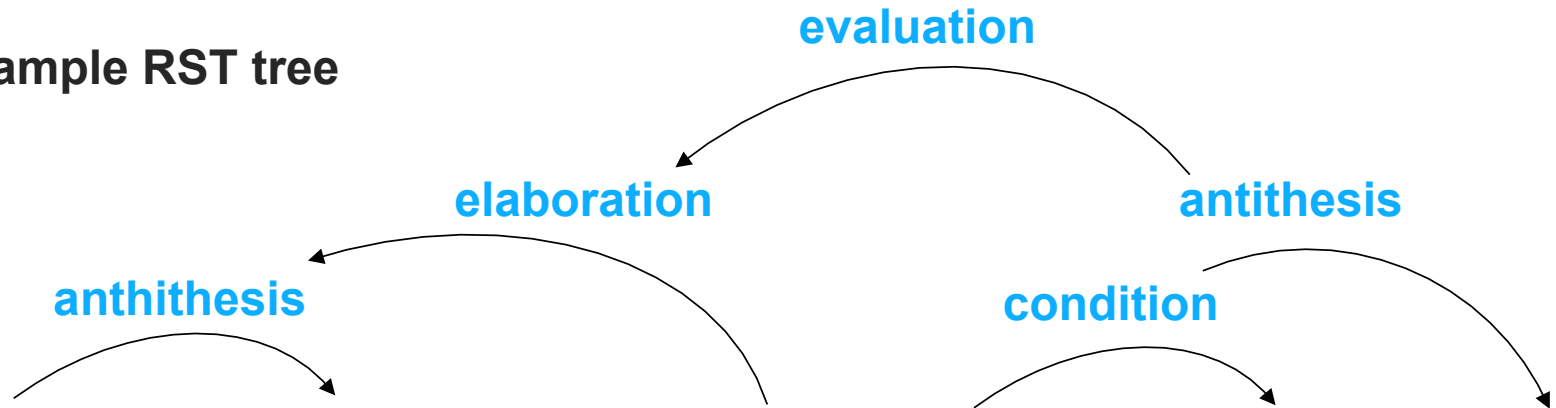
- **Rhetorical structure theory (RST)** (Mann and Thompson, 1988)

- A model of discourse structure that captures hierarchical coherence relations between adjacent text segments.
- A coherent text is supposed to have a fully connected RST tree.
- The original RST considers 22 relation types:

Circumstance	Volitional cause	Antithesis	Evidence
Solutionhood	Non-volitional cause	Concession	Justify
Elaboration	Volitional result	Condition	Restatement
Background	Non-volitional result	Otherwise	Summary
Enablement	Purpose	Interpretation	Sequence
Motivation		Evaluation	Contrast

Discourse vs. argumentative structure based on Stede and Schneider (2018)

▪ Example RST tree



Rather than administering aid almost entirely through the slow drip of private organizations, international agencies and foreign powers should put their money and their effort into the more ambitious project of buiding a functional Haitian state.

It would be the work of years and billions of dollars.

If this isn't a burden that nations want to take on, so be it. But to patch up a dying country and call it a rescue would leave Haiti forsaken indeed, and not by God.

▪ Discourse vs. argumentative structure

- Some coherence relations encode argumentative structure.
- Discourse structure models continuity of meaning, not pragmatic functions.

Speech acts

▪ **Speech acts**

- A speech act is the utterance of a statement with a performative function.
- Speech acts, if successful, affect the world in some way.

▪ **Five kinds of speech acts** (Searle, 1969)

- **Representatives.** The speaker commits to the truth of an assertion.
- **Directives.** The speaker tries to make the listener perform some action.
- **Expressives.** The speaker expresses an emotional state.
- **Declaratives.** The speaker changes the state of the world by means of performing the utterance.
- **Commissives.** The speaker commits to doing some action in the future.

▪ **Levels of speech acts**

- Speech acts can be analyzed on three levels simultaneously: the *locution*, the *illocution*, and the *perlocution*.

Speech acts in arguments

- **Three levels of a speech act**

- **Locutionary act.** The act of saying something with a performative function.

Smoking is bad for your health.

- **Illocutionary act.** A direct or indirect act performed by a locutionary act.

Direct. *Assertion that smoking is bad for your health.*

Indirect. *Warning not to smoke.*

- **Perlocutionary act.** An act which changes the cognitive state of the listener.

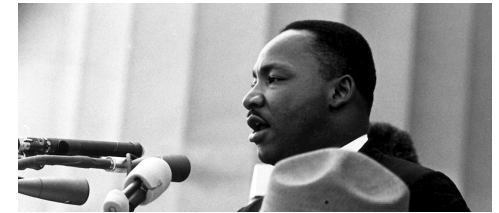
Causing the listener to adopt the intention not to smoke.

- **Speech acts in arguments**

- **Locutionary acts.** Inherent part of arguments.
- **Illocutionary acts.** Often found in claims of arguments.
- **Perlocutionary acts.** Capture the effect of an argument on the listener.

Goals of argumentation and debate based on Tindale (2007)

- **Persuasion**
 - Changing or reinforcing the stance of an audience towards an issue.
- **Agreement**
 - Resolving a dispute between multiple parties or achieving a settlement in a negotiation.
- **Justification**
 - Giving reasons or explanations for an attitude or action that might be controversial.
- **Recommendation**
 - Suggesting a decision to make, an action to take, a product to buy, or similar.
- **Deliberation**
 - Deepening one's own understanding of an issue.



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Argumentative units and arguments

Argumentative (discourse) units

▪ Argumentative function

- Argumentative language supports or attacks stances on controversial issues.
- Any claim or reason in this context has an argumentative function.

▪ Argumentative unit

- A contiguous text span with a specific argumentative function, demarcated by neighboring spans with a different function.

Also called *argument component* in the literature, particularly if part of an argument.

▪ Argumentative discourse unit (ADU)

- An argumentative unit, or a non-argumentative text span that has a rhetorical or dialectical function, gives background information, ...

Some literature sees only argumentative units as ADUs.

non-argumentative

argumentative

” *If you wanna hear my view I think that the death penalty should be abolished.*

argumen-
tative

It legitimizes an irreversible act of violence. As long as human justice remains fallible, the risk of executing the innocent can never be eliminated. ”

argumentative

Arguments

▪ Argument

- A composition of a set of argumentative units, where one takes the role of a *conclusion* and each other the role of a *premise*.
- **Conclusion.** A claim that conveys a stance on a controversial issue, implicitly or explicitly.
- **Premise.** A reason given to support (or object to) the truth of the claim.

Conclusion
Premises

Conclusion *The death penalty should be abolished.*

Premise 1 *It legitimizes an irreversible act of violence.*

Premise 2 *As long as human justice remains fallible, the risk of executing the innocent can never be eliminated.*

Observations (detailed below)

- Often, some argument units are left implicit.
- The inference from premises to conclusion follows some *scheme*.
- Arguments are inherently relational: Reasons are given for claims.

Argument conclusions

- **Three types of conclusions** (Eggs, 2002)
 - **Epistemic.** A proposition is true or false.
 - **Ethical (or esthetical).** Something is good or bad (or: beautiful or ugly).
 - **Deontic.** An action should be performed or not.
- **Example conclusions in arguments**

Epistemic. *Climate change exists. The temperature increase can be felt in our everyday lives.*

Ethical. *Using airplanes is bad because they are among the worst air polluters we have.*

Deontic. *We should tear this building down. It is full of asbestos.*

Argument premises

▪ Premises

- A reason that supports (or attacks) an argument's conclusion.
- Different but partly overlapping distinctions of premise types exist.

▪ Minor vs. major premises (Walton et al., 2008)

- **Minor.** A premise stating specific information related to an issue.
- **Major.** A generalization or rule, linking the other premises to the conclusion.

▪ Facts, warrants, and backings (Toulmin, 1958)

- **Facts (aka data).** Information specific to a given context.
- **Warrant.** A rule clarifying that the conclusion holds in case the facts hold.
- **Backing.** A justification for the warrant.

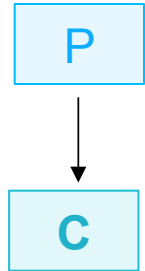
▪ Enthymeme

- An unstated (i.e., implicit) premise.
The major premise (or: the warrant and backing) often remain implicit.
- Sometimes also: an *argument* in which a premise is left unstated.
Notice that also conclusions are often implicit, but usually not called enthymemes then.

Argumentative relations

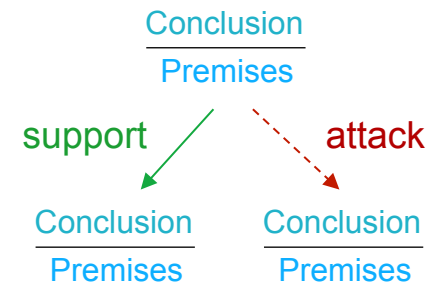
▪ Relations within arguments

- An argument defines a relation where premises support a conclusion.
- A premise may also serve as a counterconsideration that objects to a conclusion. It is then usually *undercut* in the same argument.



▪ Relations between arguments

- Different arguments may support or attack each other.
- A counterargument may attack an argument's premises or its conclusion — or the inference between them.



▪ Types of support

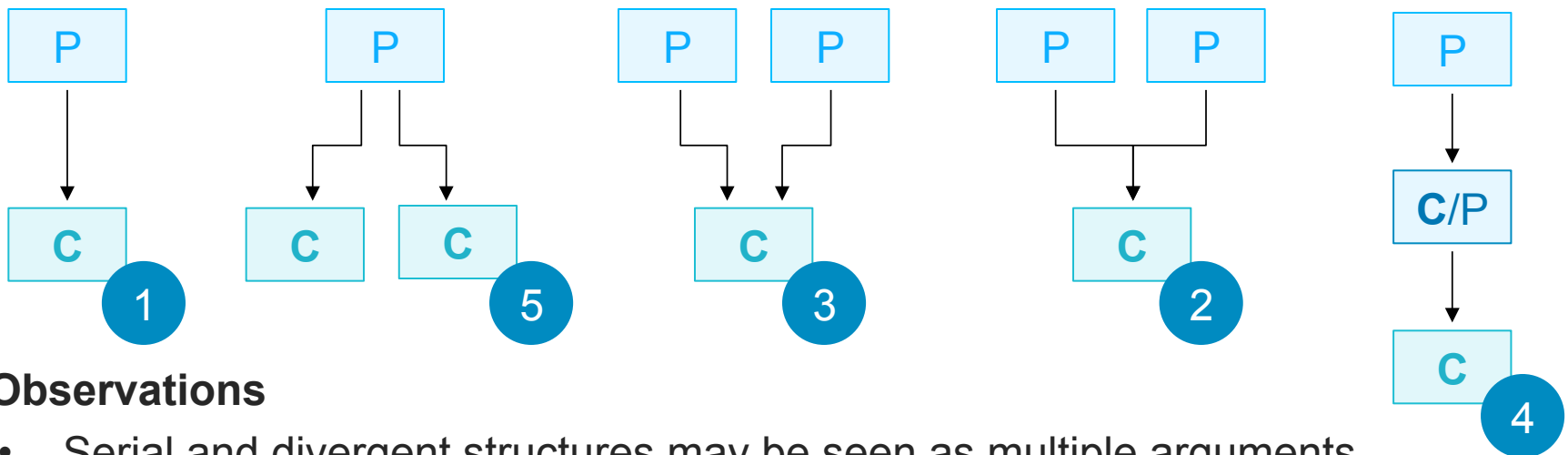
- **Simple.** A premise individually supports a conclusion (analog for arguments).
- **Linked.** Multiple premises (arguments) collectively give support.

▪ Types of attacks

- **Rebuttal.** A support of the opposite conclusion to an argument's conclusion.
- **Undercutter.** An attack of the relevance of a premise to a conclusion.

Argument structures

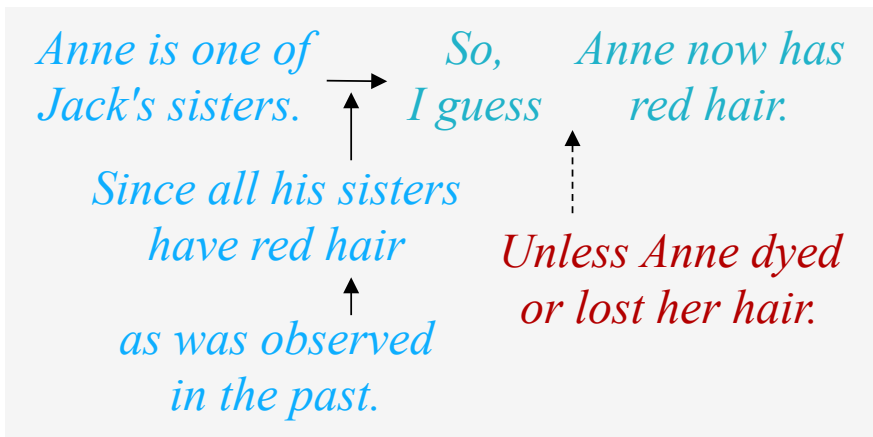
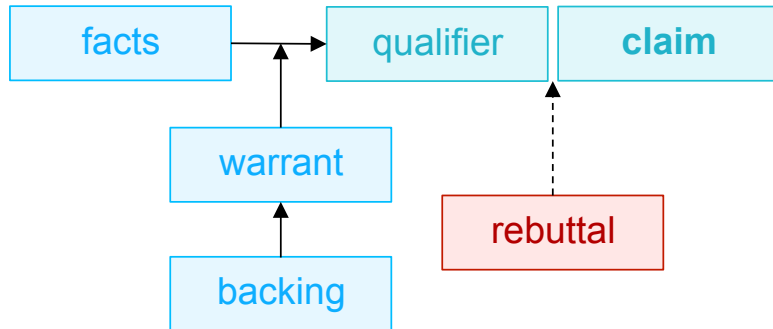
- **Five types of argument structures** (Freeman, 2011)
 1. **Single.** One premise supports a conclusion.
 2. **Linked.** All premises, taken together, support a conclusion.
 3. **Convergent.** Each premise, in isolation, supports a conclusion.
 4. **Serial.** The conclusion of one argument is a premise of another conclusion.
 5. **Divergent.** A premise supports multiple different conclusions.



- **Observations**
 - Serial and divergent structures may be seen as multiple arguments.
 - The essential distinction is whether premises are linked or convergent.

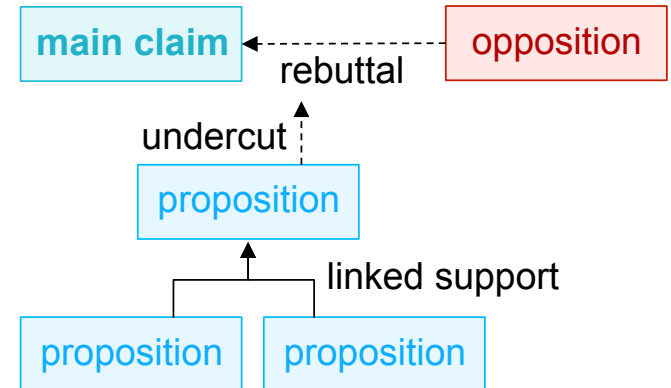
Common argument models

Focus on unit roles (Toulmin, 1958)

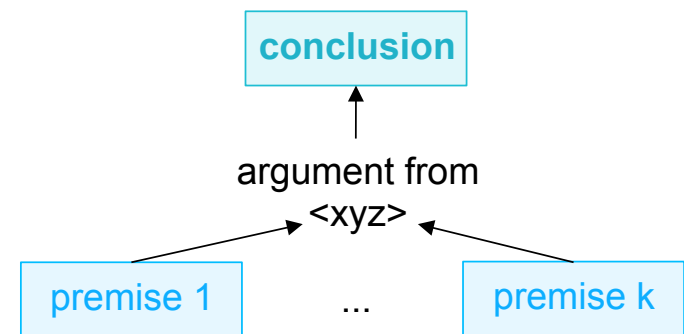


- Few real-life arguments really match this idealized model.

Focus on dialectical view (Freeman, 2011)



Focus on inference (Walton et al., 2008)



Argumentation and debate

Argumentation

▪ **Argumentation**

- The usage of arguments to achieve persuasion, agreement, or similar with respect to a stance on a controversial issue.
- Refers both to the *process* of arguing and to its *product*, i.e., a text or speech.



▪ **Components of argumentation**

- One or more arguments (given by argumentative units and their relations).
- Zero or more statements that serve rhetorical and dialectical functions, or give context and background information.

The minimal instance of argumentation is one argument.

▪ **Thesis (aka main/central/major claim)**

- The explicit or implicit conclusion of an entire argumentative text or speech.
- All other components (ideally) directly or indirectly support the thesis.

▪ **Monological vs. dialogical argumentation**

- **Monological.** A composition of arguments on a given issue.
- **Dialogical.** A series of monological argumentative turns on the same issue.

Monological vs. dialogical argumentation (recap)

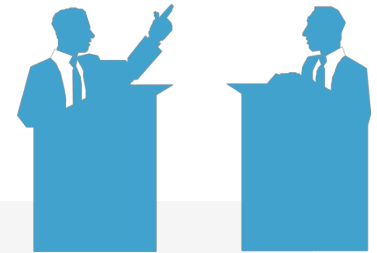


Monological argumentation

I would not say that university degrees are useless; of course, they have their value but I think that the university courses are rather theoretical. [...]

In my opinion most of the courses taken by first and second year students aim at acquiring general knowledge, instead of specialized which the students will need in their later study and work. General knowledge is not a bad thing in principle but sometimes it turns into a mere waste of time. [...]

Dialogical argumentation



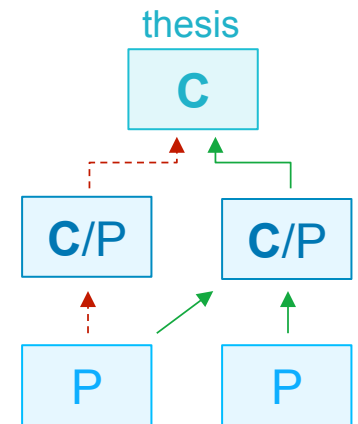
Alice. *I think a university degree is important. Employers always look at what degree you have first.*

Bob. *LOL ... everyone knows that practical experience is what does the trick.*

Alice: *Good point! Anyway, in doubt I would always prefer to have one!*

Overall structure of monological argumentation

- **Monological overall structure (aka discourse-level structure)**
 - An entire argumentative text or speech simultaneously has a *hierarchical* and a *sequential* overall structure.
- **Hierarchical overall structure**
 - The logical structure induced by all argumentative relations.
 - A thesis is supported (or attacked) by conclusions whose premises may be conclusions of other arguments, etc.
 - Can be modeled as a tree or directed acyclic graph (DAG) where nodes are ADUs and edges relations.
- **Sequential structure**
 - The structure induced by the ordering of units in a text or speech.
 - Can be modeled as a sequential flow of *rhetorical moves*, such as the stance of each ADU towards the thesis.
 - Often has rhetorical functions primarily.



Rhetorical moves and argumentative zones

▪ Rhetorical move (aka discourse function)

- A segment of text with a specific communicative function.
- Similar to a discourse mode, but focused on speech acts in argumentation.
- Both generic and task-specific sets of moves have been proposed.

(Swales, 1990; Wachsmuth and Stein, 2017)

positive	negative		thesis		introduction	body	
	neutral		conclusion	premise		rebuttal	conclusion
			none				

▪ Argumentative zones (Teufel, 1999)

- Rhetorical moves that capture the role of a text segment (usually a sentence) within the overall argumentation of a text.
- Pioneer concept that originally covered seven zones of scientific articles:

background	other	own	aim	textual	contrast	basis
background	research	research	goal of	article	own vs.	use of
knowledge	by others	in article	article	structure	other	other

Debate

▪ Debate

- In a classical "Oxford-style" debate, two opposing parties argue for or against a given claim in three stages (see below).
- In principle, the term debate covers all types of dialogical argumentation.
- Seven types of dialogue are considered as debates. (Walton, 2010)

Type	Initial situation	Participant's goal	Dialogue goal
Persuasion	Conflict of opinions	Persuade other party	Resolve or clarify issue
Inquiry	Need proof	Find and verify evidence	(Dis-)Prove hypothesis
Discovery	Need explanation of facts	Find and defend a suitable hypothesis	Choose best hypothesis for testing
Negotiation	Conflict of interests	Get what you most want	What both can live with
Information-Seeking	Need information	Acquire or give Information	Exchange information
Deliberation	Dilemma or practical choice	Coordinate goals and actions	Decide best available course of action
Eristic	Personal conflict	Verbally attack opponent	Reveal basis of conflict

Overall structure of dialogical argumentation

▪ Dialogical overall structure

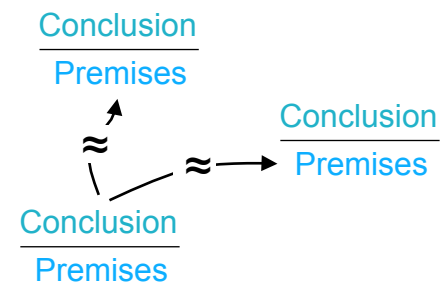
- The arguments by the participants induce a *hierarchical* structure.
- The series of turns defines a *sequential* structure, possibly with clear stages.
- **Fragmented.** Arguments may be split into disconnected turns.
- **Not plannable.** Participants need to react on the opponents' turns.

▪ Sequential structure (exemplarily for Oxford-style debates)

- **Introduction.** Each party lays out its main arguments, one after the other.
- **Discussion.** Parties respond to questions by an audience and to each other.
- **Conclusion.** Each party subsequently gives final remarks.

▪ Hierarchical structure induced by arguments

- The structure given by the relations between arguments, by the reuse of argumentative units, or similar.
- Can be modeled as a graph where nodes are arguments and edges relations (or similar).



Participants in argumentation (recap)

- **Author (or speaker)**
 - Argumentation is connected to the person who argues.
 - The same argument is perceived differently depending on the author.
- **Reader (or audience)**
 - Argumentation often targets a particular audience.
 - Different arguments and ways of arguing work for different readers.

”University education must be free. That is the only way to achieve equal opportunities for everyone.“

”According to the study of XYZ found online, avoiding tuition fees is beneficial in the long run, both socially and economically.“



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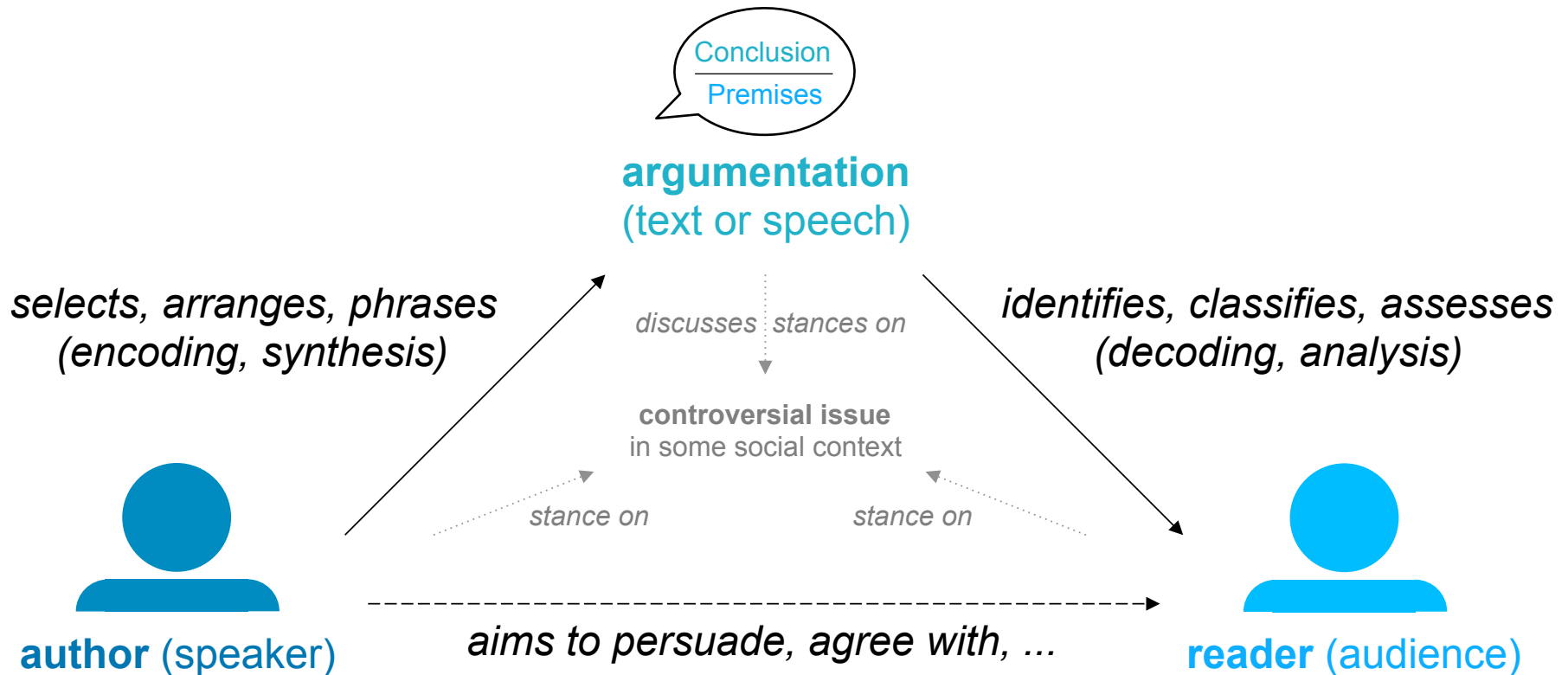


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General argumentation setting



▪ Notice

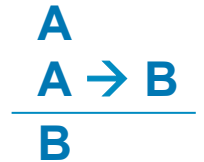
- In dialogical argumentation, the roles of the participants alternate.
- In some cases, the audience is a third, not actively involved party.
Example: In Oxford-style debates, the goal is to change the view of an audience that listens to both sides.

Logic, rhetoric, and dialectic

Logic

- **Formal argumentation** (Blair, 2012)

- Formal logic studies the *soundness* of arguments, requiring true premises and a deductively valid inference of the conclusion.
- Valid inference includes modus ponens and modus tollens.



- **Natural language argumentation**

- In the real world, truth is often unclear or unknown to the audience.
- While valid natural language arguments exist, most are *defeasible*.
- Logically good arguments are supposed to be *cogent*.

- **Defeasibility** (Stede and Schneider, 2018)

- Argumentation follows a non-monotonic logic, including tentative conclusions, which may have to be revised when new information is given.

- **Cogency** (Blair, 2012)

- A cogent argument has individually acceptable premises that are relevant to its conclusion and, together, sufficient to draw the conclusion.

Types of argumentative reasoning

▪ Three types of reasoning

- **Deductive.** A conclusion is logically inferred from the given premises.
- **Inductive.** A conclusion is likely under the given premises.
- **Abductive.** A conclusion is plausible given the premises.

Defeasible arguments are usually abductive (also called *defeasible reasoning* or *presumptive reasoning*).

Inductive.

My grandpa died. My grandma died. Elvis died. It seems that everyone dies.

Deductive.

*All humans are mortal.
Socrates is a human.
Therefore, Socrates is mortal.*

Abductive.

*Elvis can only be dead.
It just seems impossible that none of his fans ever saw him again.*

▪ Syllogism (Aristotle, 2007)

- An argument where a conclusion is *deduced* from a general statement (major premise) and a specific statement (minor premise).

The deductive example above is a syllogism.

Argumentation schemes based on Walton et al. (2008)

▪ Argumentation scheme

- The form of inference from an argument's premises to its conclusion.
- Around 60 deductive, inductive, and especially abductive schemes exist.

▪ Example schemes

- Argument from example
- Argument from cause to effect
- Syllogism
- Argument from consequence
- **Argument from position to know**

▪ Critical questions

- Each scheme is connected to a set of critical questions.
- The correct use of a scheme can be checked against them.

Conclusion *A is true.*

Major premise *Source E is in a position to know about things in a subject domain S with proposition A.*

Minor premise *E asserts that A is true (in domain S).*

1. *Is E in a position to know about A?*
2. *Is E a reliable source?*
3. *Did E assert that A is true?*

Fallacies

- **Fallacy** (Tindale, 2007)
 - An argument with some (often hidden) flaw in its reasoning, i.e., it has a failed or deceptive scheme.



"The Secret of Monkey Island" (Lucasarts, 1991)

- **Example types of fallacies**

For a rather comprehensive list, see: https://en.wikipedia.org/wiki/List_of_fallacies

- **Ad-hominem.** Attacking the opponent instead of attacking her arguments.
- **Red herring.** Introducing an unrelated issue in the reasoning.
- **Appeal to ignorance.** Taking lack of evidence as proof for the opposite.

*My girlfriend **won't** give me a gift for my birthday. I have received no indication to the contrary from her.*

*My flight tomorrow **won't** be delayed. I have received no indication to the contrary from the airline.*

(credit to Mario Treiber for this example)

- **Fallacies are hard to detect**

- Structure identical to other arguments.
- Understanding and context knowledge needed.

Rhetoric

▪ Rhetoric

- The study of the merits of different strategies for communicating a stance. (Stede and Schneider, 2018)
- The ability to know how to persuade. (Aristotle, 2007)



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” Is a strong argument an effective argument which gains the adherence of the audience, or is it a valid argument, which ought to gain it? “

(Perelman and Olbrechts-Tyteca, 1969)

▪ Persuasion

- The influence of someone’s beliefs, attitudes, intentions, or similar.
- The use of techniques to make an audience think or behave in a desired way.
- Persuasive argumentation aims to be *effective*.

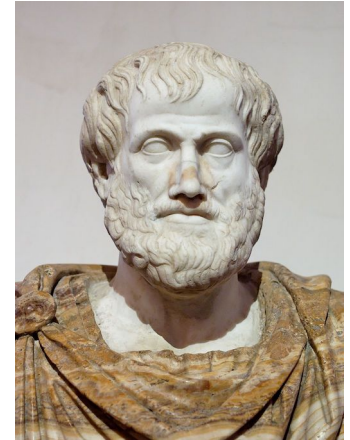
▪ (Persuasive) Effectiveness

- Argumentation is effective if it persuades the audience of (or corroborates their agreement with) the stance of the author.

Means of persuasion, style, and arrangement

”In making a speech, one must study three points: the means of producing persuasion, the style or language to be used, and the proper arrangement of the various parts.”

(Aristotle, 2007)



■ Three means of persuasion

- **Logos.** The use of logically cogent arguments.
- **Ethos.** The demonstration of a good character, authority, and credibility.
- **Pathos.** The appeal to certain emotions in the listener/reader.

Pathos is not necessarily reprehensible; it just aims for an emotional state adequate for persuasion.

■ Style and arrangement

- **Clear style.** The use of correct, unambiguous language without unnecessary complexity and deviation from the discussed issue.
- **Appropriate style.** A choice of words that fits to the issue and audience.
- **Arrangement.** The sequential structure of the presentation of arguments.

Argumentation strategies

▪ **Argumentation strategy**

- A rhetoric guiding principle followed in the synthesis of argumentation, in order to achieve persuasion.
- Encodes logos, pathos, and ethos in language tuned towards the audience.
- Decides about the selection, arrangement, and phrasing of content.

Example: "America first" <https://www.youtube.com/watch?v=dIaoZqMrbCo>

- Practically only pathos (with a bit of "ethos").
- Simple messages, loaded language, many repetitions.
- Tuned towards the core voters.



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▪ **Three steps of synthesizing an argumentative text** (Wachsmuth et al., 2018b)

1. **Select** content that *frames* the given issue in a way that is effective for the intended stance.
2. **Arrange** the structure of the content considering ordering preferences.
3. **Phrase** the style of the content to match the audience and encoded means.

Frames and framing

▪ Frame

- A frame captures an aspect under which an issue may be considered.
- A frame defines a subset of all arguments on a given issue.
- Both topic-specific and generic sets of frames have been proposed.

economics morality fiscal discrimination
health **generic** fairness **gay marriage**
and safety public opinion and equality benefits man and woman world religions

▪ Framing

- The selection of specific aspects of an issue to make them more *salient*, i.e., more noticeable, meaningful, and/or memorable.
- The same issue framed in a different way may be perceived entirely different.
- Selecting the right frames is decisive to achieve persuasion.
- The stance on an issue affects what frames should be chosen.

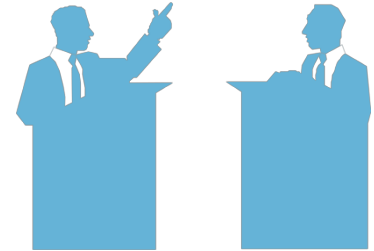
Pro. *Death penalty saves costs for imprisonment.*

Con. *Death penalty kills.*

Dialectic

▪ Dialectic

- Dialectic considers debates between two parties that aim at agreement.
- In a dialectical debate, parties should argue *reasonable*.



<https://de.wikipedia.org>

▪ Reasonableness

- All arguments and the way they are stated are acceptable for all participants.
- Arguments aim to contribute to resolution, helping to arrive at a conclusion.

▪ Pragma-dialectics (van Eemeren and Grootendoorst, 2004)

- A theory to evaluate dialectical debates in an idealized process.
- The entire argumentation in a debate is viewed as a complex speech act.
- **Idealized discussion process.** Four defined stages of a debate.
- **Rules of a critical discussion.** 10 rules to obtain reasonableness in the debate.
Variants with different numbers of rules are also found in the literature.
- **Strategic maneuvering.** Parties follow both dialectical and rhetorical goals.

Stages and rules of a critical discussion based on van Eemeren et al. (2002)

▪ Idealized discussion stages

- **Confrontation.** Establishment of the difference of opinion.
- **Opening.** Agreement on the rules and focus of the discussion.
- **Argumentation.** Defense of stances by putting forward arguments to counter the opponent's arguments.
- **Closing.** Evaluation of whether and how the difference of opinion is resolved.



▪ Rules of a critical discussion (1–4)

1. **Freedom.** Parties must not prevent each other from advancing stances or from casting doubt on stances.
2. **Burden of proof.** A party that advances a stance is obliged to defend it if asked by the other party to do so.
3. **Stance.** A party's attack must relate to the stance that has been advanced by the other party before.
4. **Relevance.** A party may defend a stance only by advancing argumentation related to that stance.



Rules of a critical discussion (cont.) based on van Eemeren et al. (2002)

▪ Rules of a critical discussion (5–10)

5. **Starting point.** A party may not falsely present a premise as an accepted starting point, nor deny a premise representing an accepted starting point.
6. **Unexpressed premise.** A party may not deny a premise that it has left implicit, or falsely present something as a premise that the other party has left implicit.
7. **Argumentation scheme.** A party may not regard a stance as conclusively defended if the defense does not take place by means of a correctly applied argumentation scheme.
8. **Validity.** A party may use only arguments that are logically valid or can be made logically valid by making one or more unexpressed premises explicit.
9. **Closure.** A party must retract its stance, if it failed a defense or if the other party made a conclusive defense
10. **Usage.** A party must not use insufficiently clear or confusingly ambiguous formulations, and must interpret the other party's formulations as carefully and accurately as possible.



Strategic maneuvering and debate analysis

▪ **Strategic maneuvering**

- Even when agreement is the goal, participants want to effectively persuade others of their stance.
- They need to *maneuver* between dialectic and rhetoric.



<https://pixabay.com>

▪ **Aspects of strategic maneuvering**

Topic potential

Selection of the most effective content currently available.

Audience demand

Adaptation to the frame of reference of the audience.

Presentational devices

Exploitation of effective and reasonable style and other expressions.

▪ **Evaluation based on the rules of a critical discussion**

1. Determination of the discussed issue.
2. Recognition of the stances that the parties adopt.
3. Identification of all explicit and implicit arguments.
4. Analysis of the argumentative structure of the debate.



<https://www.maxpixel.net>

Argumentation quality

$$\frac{A \quad A \rightarrow B}{B}$$

Logic

"A dialectical discussion derives its reasonableness from a dual criterion: problem validity and intersubjective validity."

van Eemeren (2015)

Dialectic

$$\frac{A \quad A \rightarrow B}{B}$$
$$\frac{B \rightarrow C}{C}$$



<https://de.wikipedia.org>

"An argument is cogent if its premises are relevant to its conclusion, individually acceptable, and together sufficient to draw the conclusion."

Blair (2012)

Argumentation quality

Rhetoric

"In making a speech, one must study three points: the means of producing persuasion, the style or language to be used, and the proper arrangement of the various parts."

Aristotle (2007)

$$\frac{A \quad A \rightarrow B}{B}$$



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Conclusion

Conclusion

Argumentative language

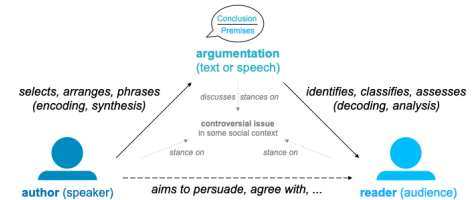
- Claims and reasons related to sentiment and truth.
- Deals with stance on controversial issues.
- Targets persuasion, agreement, deliberation, or similar.



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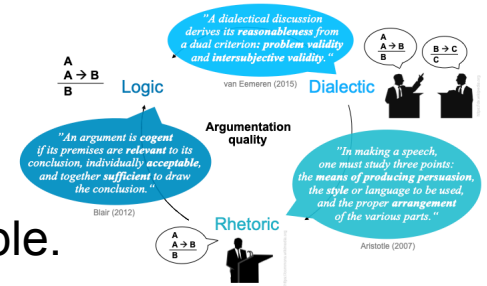
Argumentation and debate

- Compose premises and conclusions in arguments.
- Comprise a sequential and a hierarchical structure.
- Always affected by the specific participants.



Logic, rhetoric, and dialectic

- Most arguments follow defeasible inference schemes.
- Strategies are based on the means of persuasion.
- Good arguments are cogent, effective, and/or reasonable.



References

- **Aristotle (2007)**. Aristotle (George A. Kennedy, Translator). *On Rhetoric: A Theory of Civic Discourse*. Clarendon Aristotle series. Oxford University Press, 2007.
- **Blair (2012)**. J. Anthony Blair. *Groundwork in the Theory of Argumentation*. Springer Netherlands, 2012.
- **Eggs (2000)**. Ekkehard Eggs. *Vertextungsmuster Argumentation: Logische Grundlagen*. In: *Text- und Gesprächslinguistik*, vol. 16 of *Handbücher zur Sprach- und Kommunikationswissenschaft*, pages 397–414, 2000.
- **Freeley Freeley and Steinberg (2009)**. Austin J. Freeley and David L. Steinberg. *Argumentation and Debate*. Cengage Learning, 12th edition, 2008.
- **Mann and Thompson (1988)**. William C. Mann and Sandra A. Thompson. 1988. *Rhetorical Structure Theory: Toward a Functional Theory of Text Organization*. *Text* 8(3), pages 243–281, 1988.
- **Park and Cardie (2014)**. Joonsuk Park and Claire Cardie. *Identifying Appropriate Support for Propositions in Online User Comments*. In: *Proceedings of the 1st Workshop on Argumentation Mining*, pages 29–38, 2014.
- **Perelman and Olbrecht-Tyteca (1969)**. Chaïm Perelman and Lucie Olbrechts-Tyteca. 1969. *The New Rhetoric: A Treatise on Argumentation* (John Wilkinson and Purcell Weaver, translator). University of Notre Dame Press.
- **Searle (1969)**. John R. Searle. *Speech Acts: An Essay in the Philosophy of Language*. Cambridge University Press, 1969.
- **Smith (2003)**. Carlota Smith. *Modes of Discourse. The Local Structure of Texts*. Cambridge University Press, 2003.
- **Stede and Schneider (2018)**. Manfred Stede and Jodi Schneider. *Argumentation Mining*. *Synthesis Lectures on Human Language Technologies* 40, Morgan & Claypool, 2018.
- **Swales (1990)**. John M. Swales. *Genre Analysis: English in Academic and Research Settings*. Cambridge University Press, 1990.

References

- **Teufel et al. (1999)**. Simone Teufel, Jean Carletta, and Marc Moens. An Annotation Scheme for Discourse-level Argumentation in Research Articles. In Proceedings of the EACL, 1999.
- **Tindale (2007)**. Christopher W. Tindale. Fallacies and Argument Appraisal. Critical Reasoning and Argumentation. Cambridge University Press, 2007.
- **Toulmin (1958)**. Stephen E. Toulmin. The Uses of Argument. Cambridge University Press, 1958.
- **van Eemeren et al. (2002)**. Frans van Eemeren, Rob Grootendorst, and Francisca Snoeck Henkemans. Argumentation: Analysis, Evaluation, Presentation. Lawrence Erlbaum Associates. pages 182–183, 2002.
- **van Eemeren and Grootendorst (2004)**. Frans H. van Eemeren and Rob Grootendorst. A Systematic Theory of Argumentation: The Pragma-Dialectical Approach. 2004.
- **van Eemeren (2015)**. Frans H. van Eemeren. Reasonableness and Effectiveness in Argumentative Discourse: Fifty Contributions to the Development of Pragma-Dialectics. Argumentation Library. Springer International Publishing, 2015.
- **Wachsmuth et al. (2017c)**. Henning Wachsmuth and Benno Stein. A Universal Model of Discourse-Level Argumentation Analysis. Special Section of the ACM Transactions on Internet Technology: Argumentation in Social Media, 17(3):28:1–28:24, 2017.
- **Wachsmuth et al. (2018b)**. Henning Wachsmuth, Manfred Stede, Roxanne El Baff, Khalid Al-Khatib, Maria Skeppstedt, and Benno Stein. Argumentation Synthesis following Rhetorical Strategies. In Proceedings of the 27th International Conference on Computational Linguistics, pages 3753–3765, 2018.
- **Walton et al. (2008)**. Douglas Walton, Christopher Reed, and Fabrizio Macagno. Argumentation Schemes. Cambridge University Press, 2008.
- **Walton (2010)**. Douglas Walton. Types of Dialogue and Burdens of Proof. In Computational Models of Argument - Proceedings of COMMA 2010, number 216 in Frontiers in Artificial Intelligence and Applications, pages 13–24, 2010.