

Methods in Philosophical and Critical Thinking

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02.ARGUMENT ANALYSIS & LOGICAL FORM



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How do we analyze arguments?

- The goal of the course is to learn about the tools and strategies we can employ to analyze arguments.

- Three (informal) strategies:
 - paraphrasing
 - diagramming
 - matrices
 - ...

- There can be many other strategies of course. In general, the goal is to turn something that we cannot grasp immediately, for various reasons, into something we can grasp and understand.

Language's opacity

- What are the reasons for language being “opaque” to rational argumentation. Or, why do we need to “transform” arguments in order to understand them?

- Imperfection of natural languages
- Intentions of the author (rhetoric can reach farther than argumentation);
i.e. the argument may be there, but cloaked in rhetoric
- Distance in time (language changes)
- Idiosyncrasies of the author/speaker
- ...

Language's opacity

- Natural language is typically different from the language we use when trying to reconstruct the arguments we find in normal discursive form.

- Examples:
 - Sara and Sam got married and had a baby
 - “Unfortunately for the good sense of mankind, the fact of their [people’s] fallibility is far from carrying the weight in their practical judgment, which is always allowed to it in theory; for while every one well knows himself to be fallible, few think it necessary to take any precautions against their own fallibility, or admit the supposition that any opinion of which they feel very certain, may be one of the examples of the error to which they acknowledge themselves to be liable.” John Stuart Mill, *On Liberty*

Language's opacity

□ Examples:

3.03 Thought can never be of anything illogical, since, if it were, we should have to think illogically.

3.031 It used to be said that God could create anything except what would be contrary to the laws of logic.—The truth is that we could not say what an 'illogical' world would look like.

3.032 It is as impossible to represent in language anything that 'contradicts logic' as it is in geometry to represent by its co-ordinates a figure that contradicts the laws of space, or to give the co-ordinates of a point that does not exist.

Ludwig Wittgenstein, Tractatus Logico-Philosophicus

Strategies for analyzing arguments — paraphrasing

- Idea: “clarify an argument by setting forth its propositions in clear language and in logical order”

- Phases:
 - change all the words that might be obscure into clear ones
 - eliminate all unnecessary words (e.g. in many cases, attributive adjectives can be eliminated)
 - break down composites into simple propositions (a proposition is normally understood as “a sentence which affirms or denies a predicate of a subject”; e.g. “Socrates is mortal.”)
 - put the remaining components in logical order

- Key concepts
 - translation/transformation
 - ordering

Strategies for analyzing arguments — paraphrasing

- Examples: [Copi-Cohen p. 39]

Nicholas Kristof equates the hunting of whales by Eskimos with the whaling habits of Japanese, Norwegians, and Icelanders. The harsh environment of the Inupiat [Eskimos] dictates their diet, so not even the most rabid anti-whaling activist can deny their inalienable right to survive. The Japanese and the European whale-hunting countries can choose the food they consume; they have no need to eat whales. It is not hypocritical to give a pass to the relatively primitive society of the Inupiat to hunt a strictly controlled number of whales for survival while chastising the modern societies that continue to hunt these magnificent mammals for no good reason.

Joseph Turner, "Their Whale Meat, and Our Piety," *The New York Times*, 18
September 2003

Strategies for analyzing arguments — paraphrasing

- Nicholas Kristof equates the hunting of whales by Eskimos with the whaling habits of Japanese, Norwegians, and Icelanders.
- No activist can deny the Inupiat's [Alaska's Eskimos] right to survive.
- The Japanese and the European whale-hunting countries can choose the food they consume.
- The harsh environment of the Inupiat makes it impossible for them to choose what to eat.
- To survive, Inupiat have to eat whales.
- It is not hypocritical to give a pass to Inupiat to hunt a strictly controlled number of whales.
- It is wrong to hunt whales if you can choose what to eat.
- It is wrong to equate the hunting of whales by Inupiat with the whale-hunting of the Japanese, Norwegians and Icelanders.

Joseph Turner, "Their Whale Meat, and Our Piety," The New York Times, 18
September 2003

Strategies for analyzing arguments — diagramming

- Idea: “representing the structure of an argument graphically”
- Phases:
 - number sequentially each proposition of an argument (if two propositions express the same thought, apply the same number)
 - construct a diagram where the premises appear on top of the conclusions and where arrows link premises with the conclusions the premises support
 - if more than one premise support a conclusion, bracket the group of premises supporting the relevant conclusion
 - if necessary, apply any necessary transformation as in the strategy of paraphrasing
- Key concepts
 - grouping (numbering)
 - graphing (spatial order, arrows, brackets)

Strategies for analyzing arguments — diagramming

- Examples: [Copi-Cohen, p.46]

The dominant characteristic of sprawl is that each component of a community—housing, shopping centers, office parks, and civic institutions—is segregated, physically separated from the others, causing the residents of suburbia to spend an inordinate amount of time and money moving from one place to the next. And since nearly everyone drives alone, even a sparsely populated area can generate the traffic of a much larger traditional town.

Andres Duany, Elizabeth Plater-Zyberk, and Jeff Speck, *Suburban Nation: The Rise of Sprawl and the Decline of the American Dream* (New York: North Point Press, 2000).

Strategies for analyzing arguments — matrices and retrograde analysis

- Idea: “summarizing the available information present in an argument into a table”

- Phases:
 - when a problem contains information that cannot be easily stored in our short term memory, or visualized all at once, construct a table where all the information is given schematically.
 - analyze the table to reconstruct the argument or solve the problem

- Key concepts
 - retrograde analysis
 - reason problems (puzzles, quizzes, etc.)

Strategies for analyzing arguments — matrices & retrograde analysis

□ Examples:

"Take some more tea," the March Hare said to Alice, very earnestly.

"I've had nothing yet," Alice replied in an offended tone, "so I can't take more."

"You mean you can't take less," said the Hatter: "it's very easy to take more than nothing."

"Nobody asked your opinion," said Alice."

Lewis Carroll, Alice in Wonderland

Other strategies: looking for Background Assumption by Patching Deductive Holes

- All book written by Thomas Mann are good, therefore The Magic Mountain is good.

Missing link?

- If that is Jyrkis blood, then it is type A blood. Therefore it is not Jyrkis blood.

Missing link?

- No one else than the janitor has exited the front door. Therefore the murderer has used the backdoor.

Missing link?

Identifying arguments I

What is the argument?

“Because [Gordon] Libby is known for his carefulness, it is very unlikely that he would have leaked confidential information to the press right after meeting Cheney unless Cheney authorized the leak.”

N. Kristof, NY Times 6.2.2007

Identifying arguments II

What is the argument?

- A. Every occurrence has a (causal) reason.
- B. Peoples actions are occurrences.
- C. Therefore every act is predetermined.

"The Principle of Alternate Possibilities", Harry Frankfurt, 1969, *Journal of Philosophy*

Causal determinism: For each moment in time it is true that every truth after that time follows from a complete description of the facts and laws of nature of the preceding moment in time.

PAP: A person is morally responsible for his actions only if he could have acted differently.

From informal to formal strategies of reasoning

- ❑ QUESTION: Could a computer perform the reasoning strategies we have seen so far?
- ❑ The strategies we have seen so far are not formalized, that is, cannot be transformed into a “calculus” in the mathematical sense.
- ❑ Since the dawn of mankind (the dawn of the historical phase at least) people have tried to come up with a “calculus” for reasoning.
- ❑ A calculus is a mechanical procedure
- ❑ Historical note: we will see that machines can only perform part of the “calculus” that humans perform. For a concept of a calculus that can be performed by a machine we will have to wait until the modern era and, in particular, the XX century and the concept of “Turing computability”

Logical Consequence and the Validity of Arguments

An argument is **valid** if and only if (iff):

necessarily, if the premises are true, the conclusion is true.

The conclusion of a valid argument is the logical consequence of its premises.

An argument is **sound** iff it is valid and the premises are true.

Logical Consequence and the Validity of Arguments

- The validity of arguments is not dependent on what the argument deals with. Validity is a property of the *logical form* of the argument.
 - “If Powell knew that the claim regarding Nigerian Uranium was bogus, he would not have presented it to the UN. But he did present it, so he did not consider it to be bogus.”
 - “If the theory of rational expectation is true, active financial politics has no impact on business cycles. But it does impact them, so the theory is false.”

- *If P, then not-Q, Q, so not-P.*

Logical Consequence and the Validity of Arguments

- $\sim P$ is a *negation* of P (“not P”).
- $(P \& Q)$ is a *conjunction* of P and Q (“P and Q”).
- $(P \vee Q)$ is a(n inclusive) *disjunction* of P and Q (“P or Q”).
- $(P \rightarrow Q)$ is a *material implication* between P and Q, where P is the antecedent and Q the consequent (“If P, then Q”).
 - Note: The consequent is not necessarily the “conclusion”, because implication is not necessarily in itself an argument.
- $(P \leftrightarrow Q)$ is a *material equivalence* between P and Q (P iff Q); $P \rightarrow Q$ and $Q \rightarrow P$