ADVANCED ANALYTIC RIGOUR

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The University of Melbourne

October 2020

Feedback

- **Timing**
  - Trimmed background
- **Deliberate practice**
  - Slightly less
  - Set time in the middle of each seminar
  - Discuss some answers, but provide comments for all work after class

Today's seminar
Analysing argument structure

1. Surface-level reasoning and its underlying logic
2. Complexities with validity due to language
3. Reasoning Stratagems

1. Surface-level reasoning and its underlying logic

Surface-level reasoning and underlying logic

Practice Exercises
1: Underlying logic

15 minutes

Reasoning in natural language
Example: Sherlock Holmes

"You appeared to be surprised when I told you, on our first meeting, that you had come from Afghanistan."

"You were told, no doubt."

"Nothing of the sort. I knew you came from Afghanistan. From long habit the train of thoughts ran so swiftly through my mind, that I arrived at the conclusion without being conscious of intermediate steps. There were such steps, however. The train of reasoning ran, “Here is a gentleman of a medical type, but with the air of a military man. Clearly an army doctor then. He has just come from the tropics, for his face is dark, and that is not the natural tint of his skin, for his wrists are fair. He has undergone hardship and sickness, as his haggard face says clearly. His left arm has been injured. He holds it in a stiff and unnatural manner. Where in the tropics could an English army doctor have seen much hardship and got his arm wounded? Clearly in Afghanistan.” The whole train of thought did not occupy a second. I then remarked that you came from Afghanistan, and you were astonished."

- *A Study In Scarlet*, Arthur Conan Doyle, 1887.

Questions?

2. Reasoning in "natural language"

Complications with validity

Reasoning in "natural language"
Reasoning is objective but difficult

1. If George belongs to the terrorist group True Patriots, then he would most likely read the National Pride Today forum. George does read the National Pride forum; therefore, he probably belongs to the True Patriots.

2. Sarah won't defect unless Frank does. Frank is going to defect. Therefore Sarah will also.

3. The suspect engaged in activities of security relevance, resulting in an investigation which found the suspect not to be engaged in any activities that pose a security concern.

4. The Chinese government tried to cover up the origins of the corona virus. The most likely explanation for the cover up is that it originated from a lab. Therefore, coronavirus originated in a lab.

LOOKING A VISION

Glasses magnify intellect, looks

Hanna Mills

Specs sex up a potential mate, while more Aussies want glasses to boost their intellectual appeal, figures show.

More than one in 10 Aussies said glasses made a person more attractive, Roy Morgan Research for optometrists Specsavers shows.

More than one in 10 also believed spec-wearers were more intelligent than those without glasses.

But less than 10 per cent of the survey's 2182 respondents wore glasses they didn't need to increase perceptions of their intellect or because specs suited their industry.

Specsavers managing director Peter Larsen said glasses were no longer simply functional, but an accessory that could change the way you look.

"Some people think they feel more attractive with their glasses on," Larsen said.

In an increasingly stylish world, glasses should be changed as often as shoes, Larsen said.

And he's one of a growing number of Aussies to succumb to the lure of a strong pair of specs on the opposite sex.

"I think girls in glasses are very sexy," he said.

Melbourne image consultant Imogen Lamport, of Bespoke Image, said a pair of specs could boost a person's sex appeal by hiding their less appealing assets.

"Glasses can hide your under-eye bags," Lamport said.

Hanna Mills

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Specsavers managing director Peter Larsen said glasses

STOP ALIEN ABDUCTIONS

For adults and children abducted by aliens from space as reported by Prof. David Jacobs, Budd Hopkins, and other investigators.

ALIEN ABDUCTEE FROM KENTUCKY WEARING A THOUGHT SCREEN HELMET

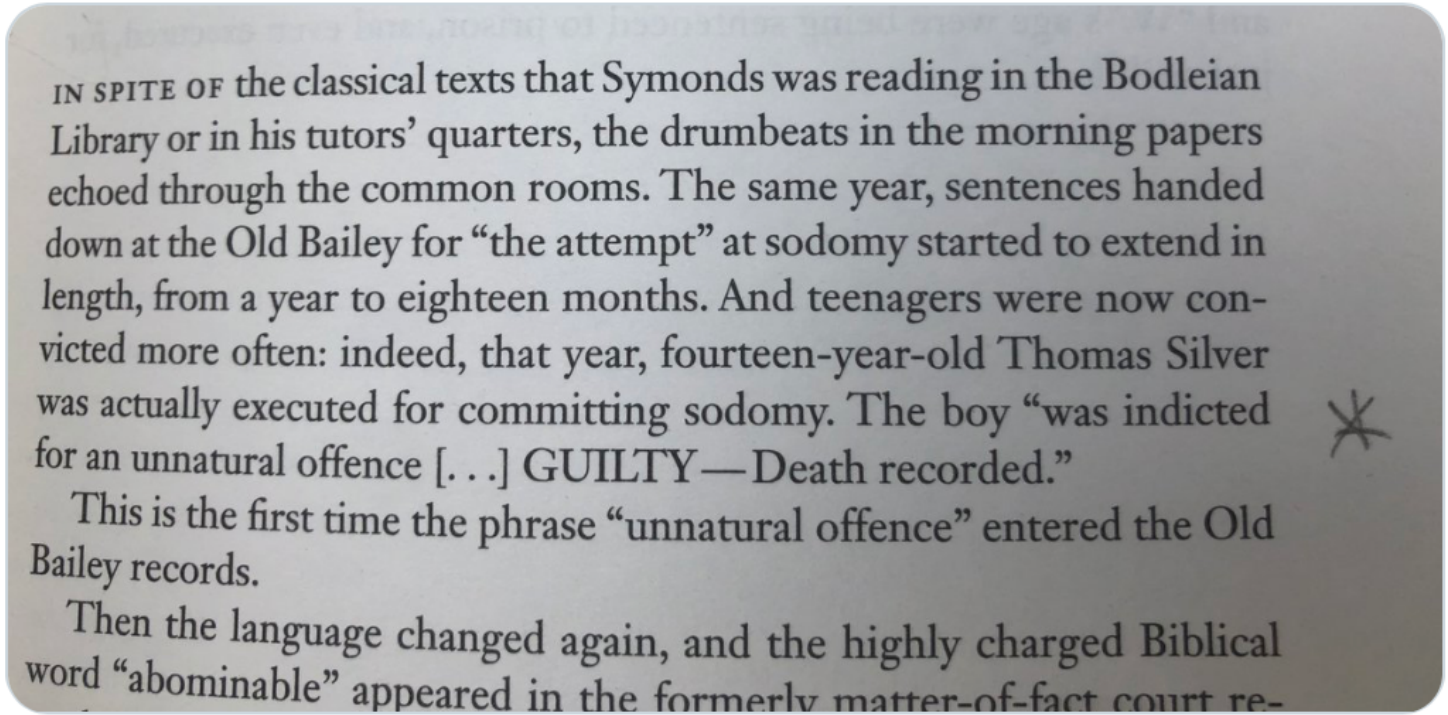
"Since trying Michael Menkin's Helmet, I have not been bothered by alien mind control. Now my thoughts are my own. I have achieved meaningful work and am contributing to society.

My life is better than ever before. Thank you Michael for the work you are doing to save all humanity."

THE THOUGHT SCREEN HELMET STOPS SPACE ALIENS FROM ABDUCTING HUMANS.

IT'S BEEN USED SUCCESSFULLY BY FORMER ABDUCTEES FOR NINETEEN YEARS.

THIS PUBLIC SERVICE, NONPROFIT, ASSEMBLY WEBSITE TELLS YOU HOW TO MAKE A THOUGHT SCREEN HELMET.



IN SPITE OF the classical texts that Symonds was reading in the Bodleian Library or in his tutors' quarters, the drumbeats in the morning papers echoed through the common rooms. The same year, sentences handed down at the Old Bailey for "the attempt" at sodomy started to extend in length, from a year to eighteen months. And teenagers were now convicted more often: indeed, that year, fourteen-year-old Thomas Silver was actually executed for committing sodomy. The boy "was indicted for an unnatural offence [. . .] GUILTY—Death recorded."

This is the first time the phrase "unnatural offence" entered the Old Bailey records.

Then the language changed again, and the highly charged Biblical word "abominable" appeared in the formerly matter-of-fact court re-

5 15 164

Matthew Sweet @DrMatthewSweet · May 24, 2019

Thomas Silver, as @naomirwolf now agrees, was not executed. The understandable confusion is produced by this "death recorded" category, which is a way of acknowledging that sodomy has been a capital crime since the 1500s, but no longer enforced. Death on paper only.

8 30 301

Validity and uncertainty

Reasoning in natural language
Levels of certainty

When we reason, every claim has a degree of certainty.

- This can either be stated explicitly or left undefined and understood by the context.
  - "I am 80% confident that Trump will lose the election"
  - "I know that World War Two ended in 1945."

We can rank beliefs, and we can determine fair bets to place on them

- The range of uncertainty can be quite large
  - but it can't get too large without the claim becoming uninformative and unable to play a role in reasoning.

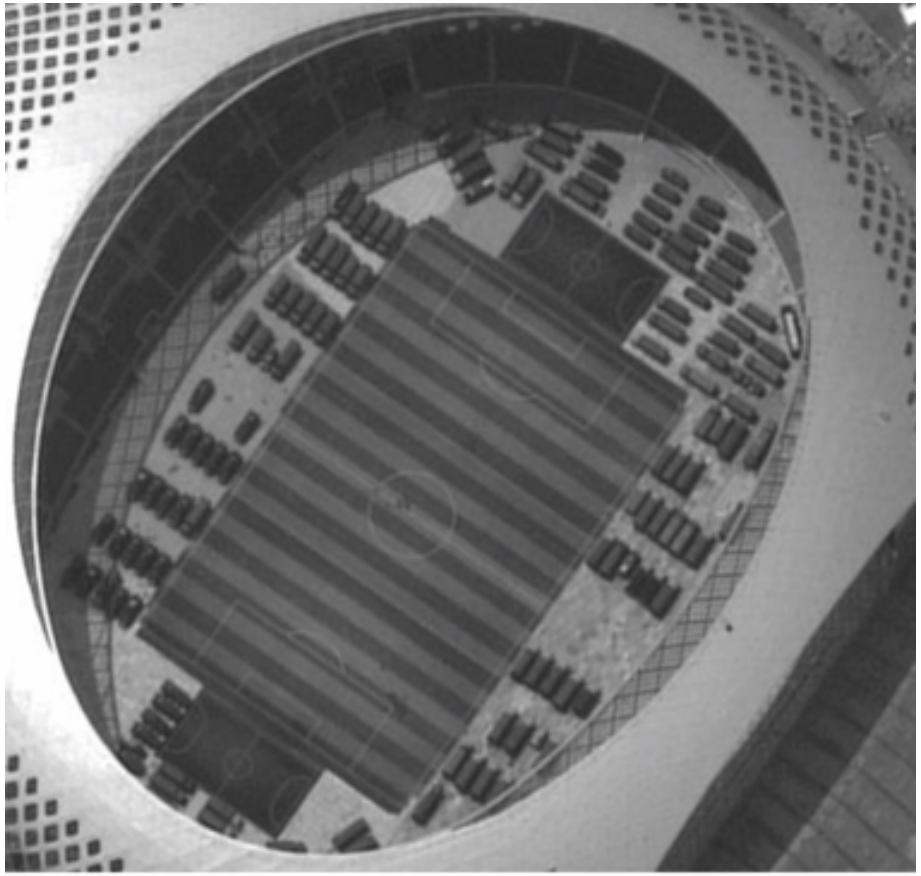
- In reasoning, degree of certainty means the probability that the claim is true *given* the reasons or evidence presented.

Reasoning in natural language
Example: degree of support

Reason:
China has moved troops close to Hong Kong.

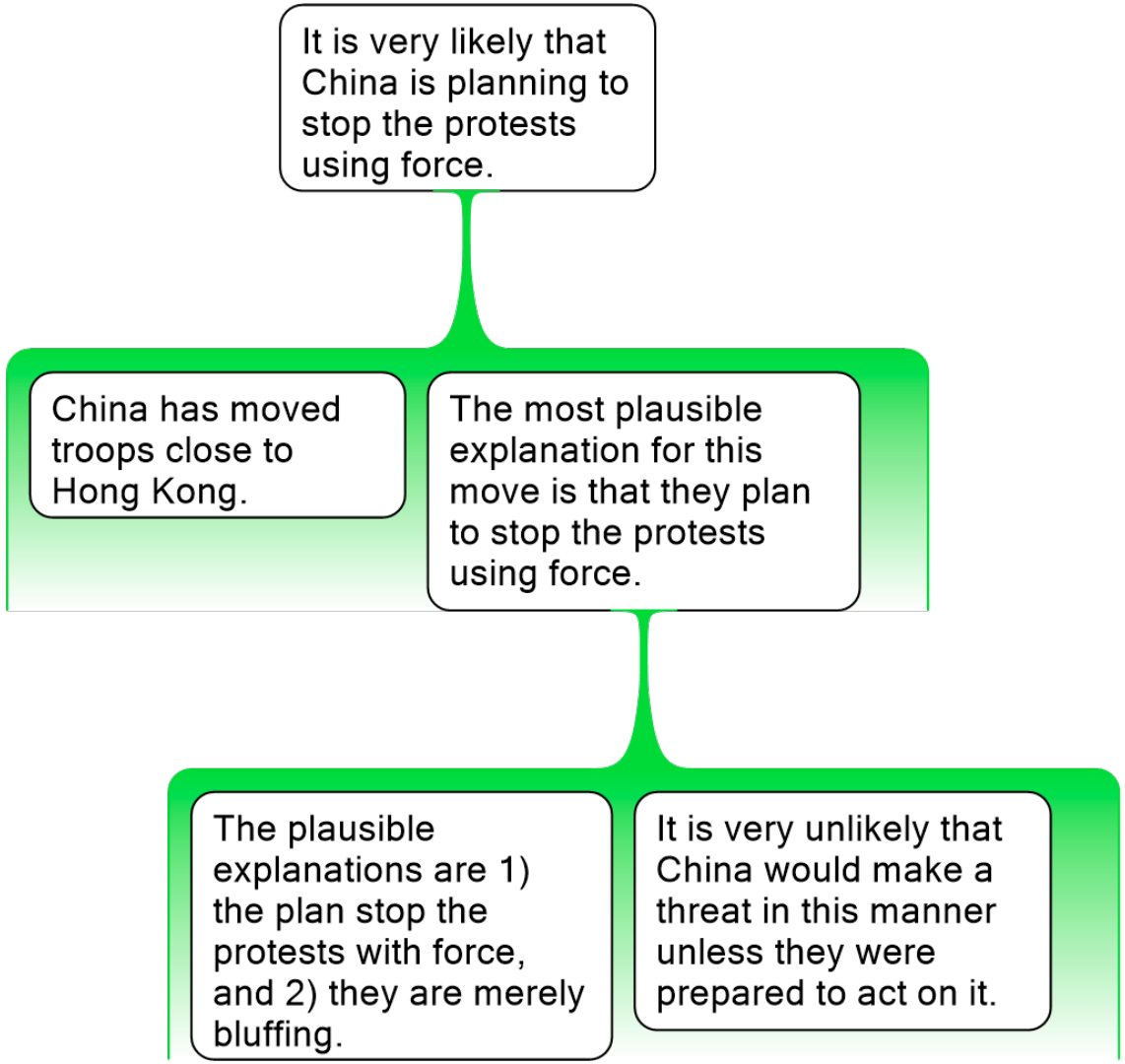
therefore

Conclusion:
China is planning to stop the protests using force.



Reasoning in natural language

Example: degree of support



Socrates was a philosopher and philosophers are boring, therefore Socrates was boring.

Socrates was a philosopher and most, maybe 80%, of philosophers are boring, therefore, it is very likely that he was boring.

Reasoning in natural language
Good reasoning and precision

Samantha is a politician who accepts donations from a foreign adversarial country, publicly defends the actions of that country, regularly holidays in that country, communicates regularly and covertly with top officials from that country, and tries to minimize knowledge of her financial connections to that country.

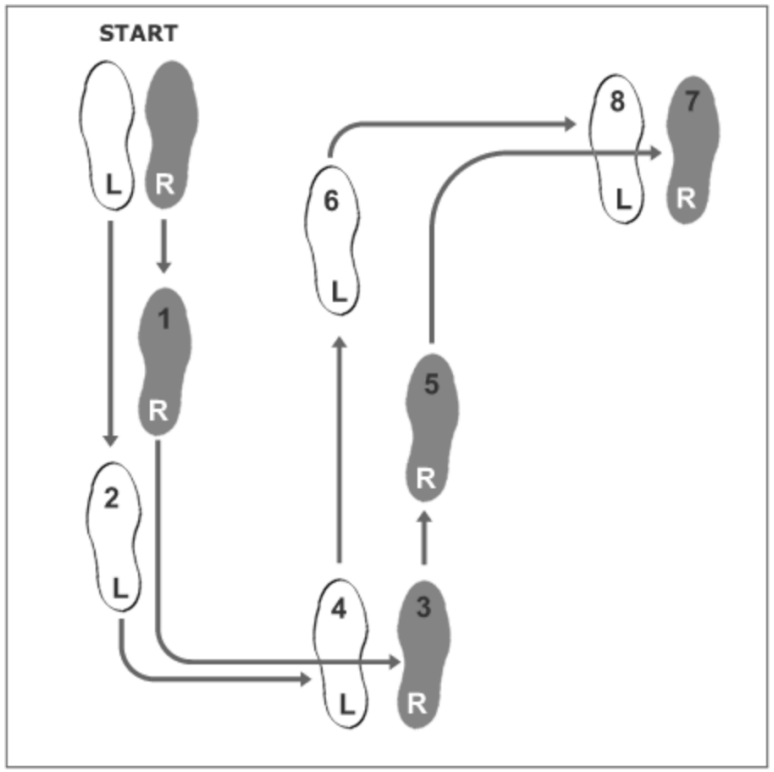
What should we conclude?

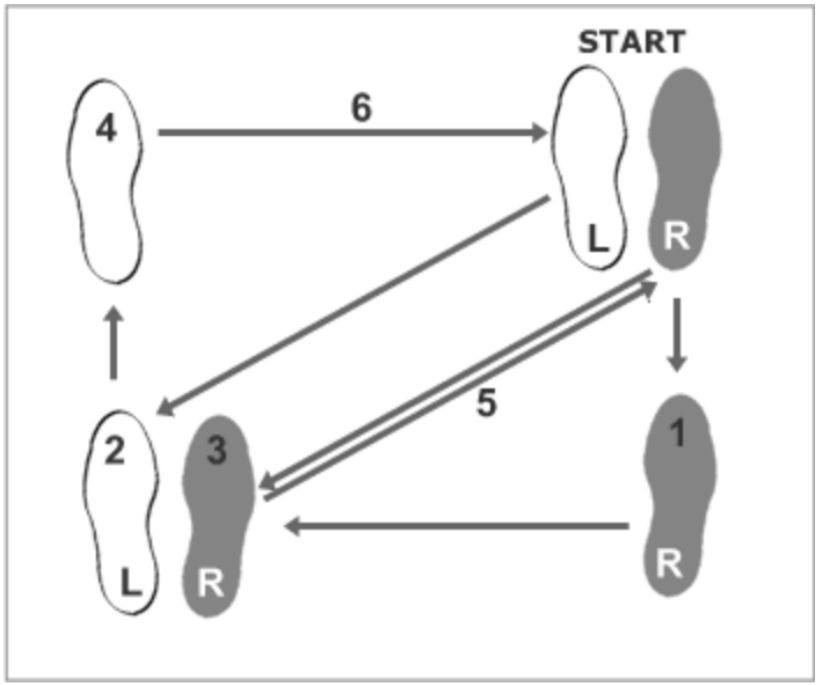
1. It is certain that Samantha is spying for that country.
2. Maybe Samantha is spying for that country.
3. There is a 50% chance that Samantha is spying for that country.
4. There is a 20 - 70% chance that Samantha is spying for that country.

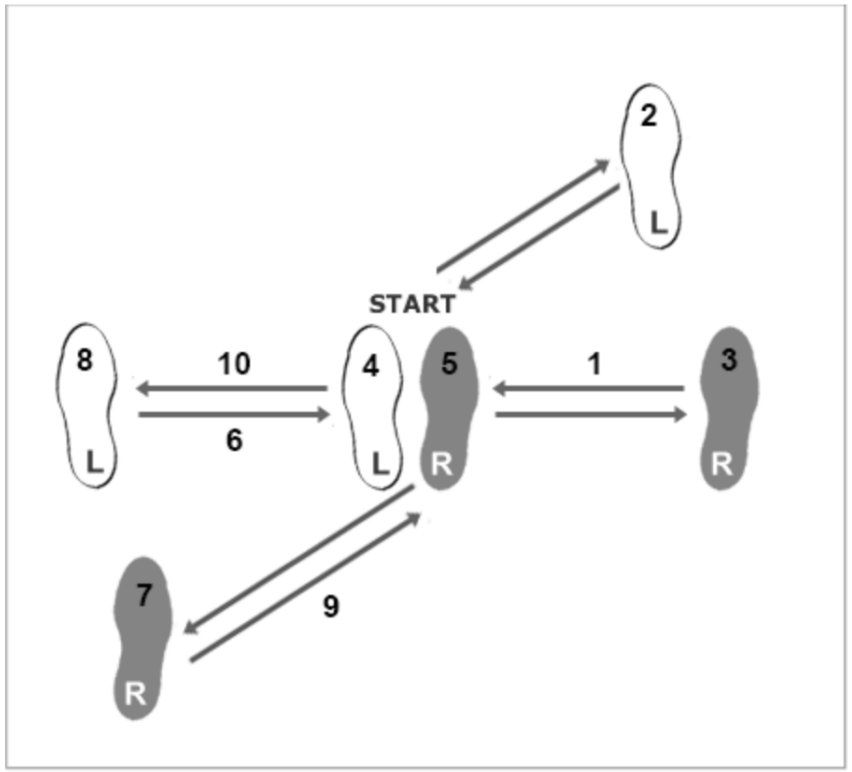
Questions?

Reasoning Stratagems

Reasoning Stratagems
The right moves







Reasoning Stratagems
Example: Inference to best explanation

It can hardly be supposed that a false theory would explain, in so satisfactory a manner as does the theory of natural selection, the several large classes of facts above specified [e.g., the geographical distribution of species, the sterility of hybrid species]. It has recently been objected that this is an unsafe method of arguing. But it is a method used in judging common events of life, and has often been used by the greatest natural philosophers. The undulatory theory of light has thus been arrived at; and the belief of the revolution of the earth on its own axis was until lately supported by hardly any direct evidence.

- Charles Darwin, *On the Origin of Species,* 1959, p. 452

Reasoning Stratagems
Example: Inference to best explanation

IBE needs to:

1) provide a comprehensive list of the plausible explanations,

2) detail the information to be explained,

3) weigh up the information that determine which explanation is the best one for the information.

Example: Inference to best explanation

George is planning a terrorist attack because that is the best explanation for his recent behaviour.

Some important reasoning stratagems

- Inference to best explanation
- Inductive generalisations
- Categorising cases
- Appeal to analogy
- Appeal to sources
  - Single sources & Corroborating sources
- Forecast
  - Changes in factors & Extrapolating past trends
- Strategic reasoning

Reasoning Stratagems
IBE (aka Abduction)

Inferences to best explanation need to:

1. Provide a comprehensive list of the information to be explained.

Will often need to make the distinction between things that are crucial and need to be explained, and those things which are more incidental, but that a full explanation will cover.

2. Determine which explanations are plausible

If a plausible explanation is overlooked, it may be the correct one.

3. Consider which explanation is best, which is generally a function of:

Their relative plausibility based on the "background" information

Their explanatory power.

Example: TV & Depression

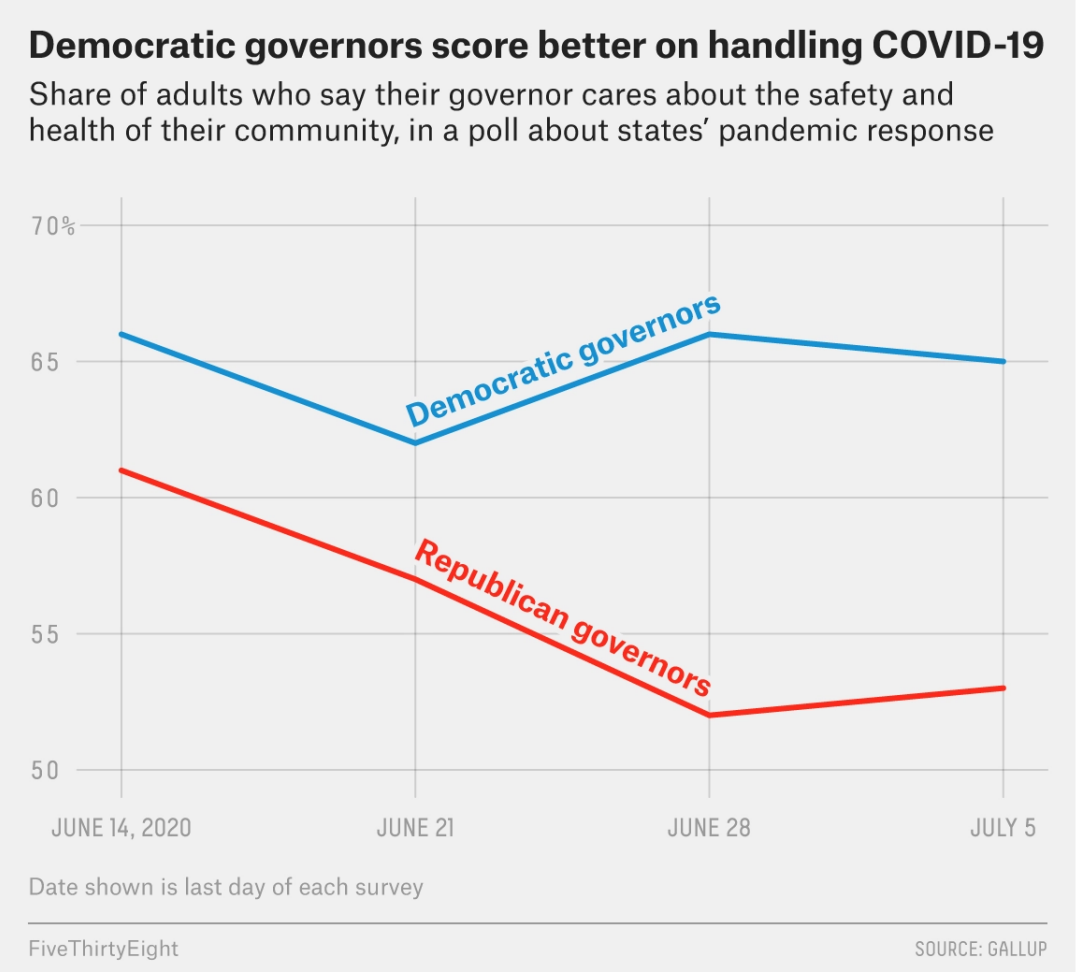
Hours watching TV correlates with depression.

Therefore, TV causes depression.

Reasoning Stratagems
Generalisations

Generalisations need to:

- Explain how reliably the information has been collected.
- Explain why the amount of information is sufficient for the conclusion.
- Establish that the information has been collected from a sample or group representative of the group you are making a conclusion about.
- Consider exceptional circumstances.



Reasoning Stratagems
Categorising cases

This is the type of argument where a generalisation is applied to an instance and used to make conclusions about it.

These arguments need to:

- Establish that the generalisation is acceptable
- Clearly explain how the instance in question is a case of the thing the generalisation is about.

Lones Smith @LonesSmith · Jul 20

Solid argument

Reasoning Stratagems
Appeal to Analogy

An argument from analogy needs to:

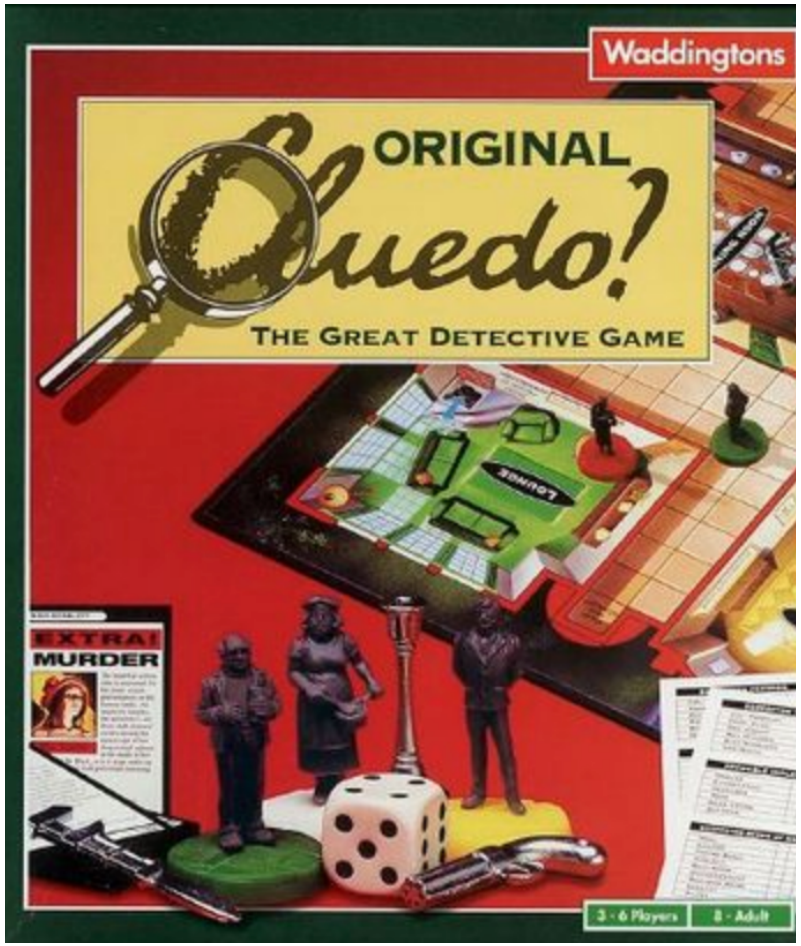
- Explain how the two situations are sufficiently similar
  - Explaining the relevant similarities
  - And that the differences are unrelated to the matter at hand
- Generally, explain how the same causal pathway could be present in both cases
  - Otherwise an argument from analogy is generalisation from insufficient data.

Reasoning Stratagems
Example: Analogy

Reasoning Stratagems
Argument by Elimination

An argument by elimination needs to:

- Provide a complete list of the options
  - Missing one option invalidates the method
- Establish that all but one of them is unacceptable
  - Each option needs to be dealt with separately; this mode of reasoning does not work by comparing options
    - Needs to be able to eliminate options with a high degree of certainty.

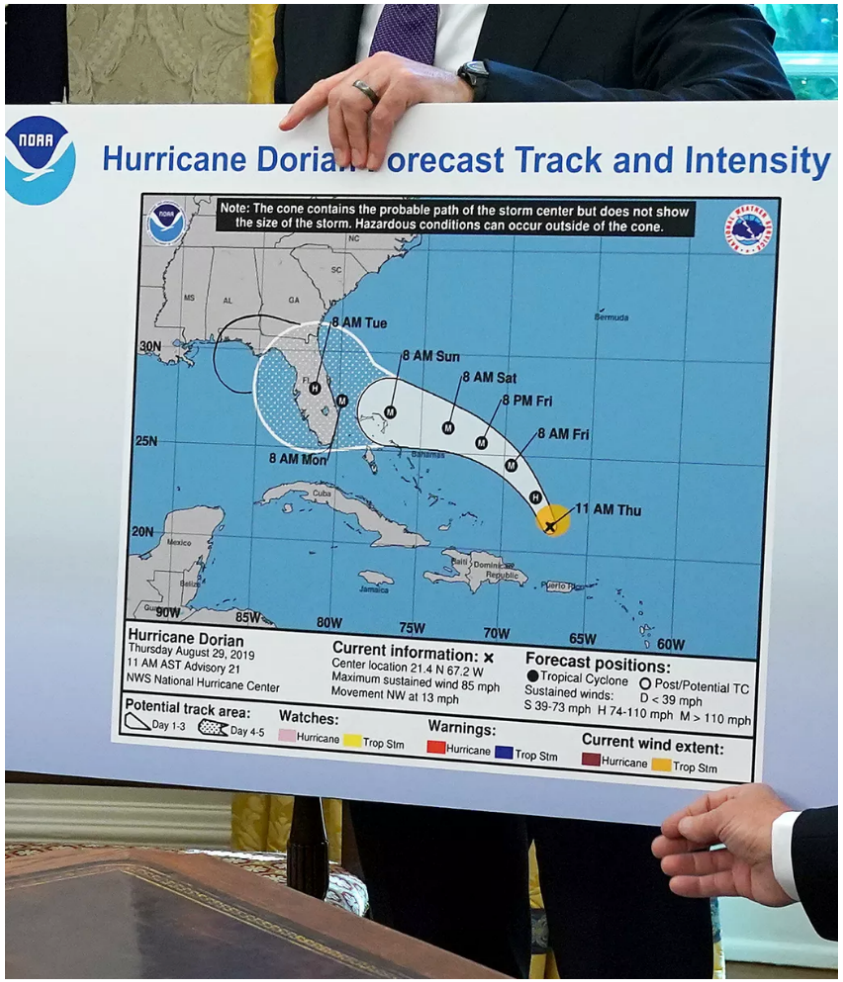


Appeals to Sources

An appeal to sources needs to do the following:

- Accurately state what the source claims
- Establish that the source is in a position to know the claim
- Establish that the source is reporting honestly in this case.

Reasoning Stratagems
Forecasts



Reasoning Stratagems
Strategic reasoning

"All the News That's Fit to Print"

The New York Times.

LATE CITY EDITION

VOL. CXII..No. 38,258. NEW YORK, TUESDAY, OCTOBER 23, 1962. FIVE CENTS

U.S. IMPOSES ARMS BLOCKADE ON CUBA ON FINDING OFFENSIVE-MISSILE SITES; KENNEDY READY FOR SOVIET SHOWDOWN

U. S. JUDGES GIVEN POWER TO REQUIRE VOTE FOR NEGROES

High Court Upholds Order Forcing the Registration of 54 in Alabama County

Chinese Open New Front; Use Tanks Against Indians

Nehru Warns of Peril to Independence —Reds Attack Near Burmese Border and Press Two Other Drives

SHIPS MUST STOP

Other Action Planned If Big Rockets Are Not Dismantled

By JAMES RESTON

ANNOUNCES HIS ACTION: President Kennedy speaking to the nation last night on radio and television. He told of moves to keep offensive equipment away from Cuba.

PRESIDENT GRAVE

Asserts Russians Lied and Put Hemisphere in Great Danger

JFK Library

THE UNIVERSITY OF MELBOURNE

ADVANCED ANALYTIC RIGOUR

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