Logical arguments

Developing Academic Writing

Homework: 1

A company ran two advertisements, one in a print magazine and another on that magazine's web site. The company could not get data about how customers reacted to the print advertisement. But they found that fewer customers responded to the web advertisement than is usual for similar web advertisements. They concluded that probably fewer customers than usual responded to the advertisement in the print magazine.

How did the company reach that conclusion?

Homework: 1

- How did the company reach the conclusion?

a. They predicted the strength of the result based on the strength of the cause.

- No cause-effect comparison

Homework: 1

- How did the company reach the conclusion?

c. They used information about frequency to conclude the likelihood of an event.

- frequency – how often something happens
- This happened once.

Homework: 1

- How did the company reach the conclusion?

d. statistical generalizations based on a large number of previous cases

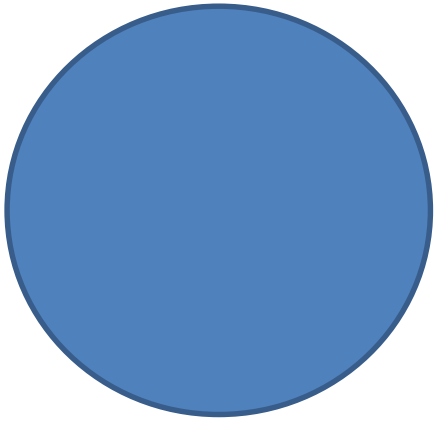
- One other case
- At the same time

Homework: 1

- How did the company reach the conclusion?

b. direct evidence about one case to make a conclusion about a similar case

- Analogy: web ad is similar to the print ad, so response is probably similar



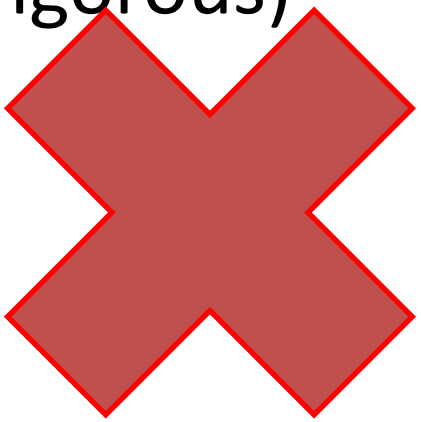
Homework: 2

During the construction of the Quebec Bridge in 1907 the bridge's designer, Theodore Cooper, received word that the section being built was bending downward slightly. Before he could arrive at the bridge to tell the builders to stop, the whole section broke off and fell into the river, killing more than seventy workers. It was the worst bridge construction disaster in history. As a result of the inquiry that followed, the "rules of thumb" engineers had used to build thousands of bridges were replaced. Modern bridge engineers use more rigorous mathematical analysis.

Homework: 2

a. Bridges built before 1907 were built without mathematical analysis and, therefore, were unsafe to use.

- “rules of thumb” based on (less rigorous) mathematical analysis
- Analysis has only an indirect link with safety.



Homework: 2

b. Cooper's absence from the Quebec Bridge construction resulted in the accident.

- No direct cause-effect relation

Homework: 2

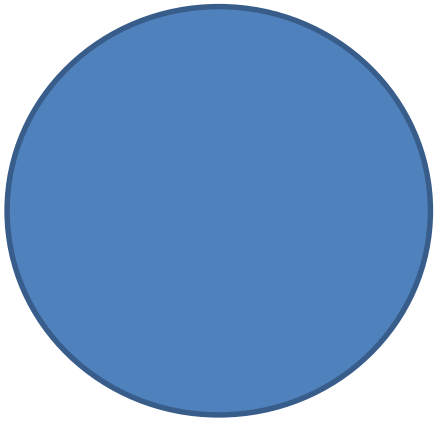
c. Bridge engineers relied on rules of thumb because analytical methods were inadequate

- No mention of why rules of thumb were used
- Unlikely that more rigorous analytical methods were less adequate

Homework: 2

d. Engineering rules of thumb were not sufficient to assure the safety of bridges.

- If rules were sufficient, all bridges were safe.
- Not all bridges were safe.
- Therefore, rules were not sufficient.



Homework: 3

Solar cells can be made from barium silicide crystals ($BaSi_2$) on a metal substrate. $BaSi_2$ crystals grow on pure silicon, but this is not useful for solar cells. Engineers succeeding in growing $BaSi_2$ crystals on titanium metal substrates, but when they put $BaSi_2$ on nickel substrates it produced nickel silicide (NiSi) crystals instead of $BaSi_2$. Based on these results, they decided to use $BaSi_2$ on a titanium substrate to develop new solar cells.

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substrate: a layer underneath something, or on top of which something happens

Homework: 3

P1. Solar cells can be made from $BaSi_2$ on a metal substrate.

P2. Titanium is a metal substrate.

($BaSi_2$ crystals form on top of titanium.)

C. Therefore, solar cells can be made from $BaSi_2$ on a titanium substrate.

Homework: 3

P1. Solar cells can be made from $BaSi_2$ on a metal substrate.

P2. $BaSi_2$ crystals will not form on top of nickel.

(Nickel is not a useable substrate.)

C. Therefore, solar cells cannot be made from $BaSi_2$ on a nickel substrate.

Homework: 3

P1. Solar cells can be made from $BaSi_2$ on a metal substrate.

P2. Solar cells cannot can be made from $BaSi_2$ on a pure silicon substrate.

C. Therefore, pure silicon is not a metal substrate. (Silicon is a metalloid.)

Homework: 4

“I have visited hotels throughout the country and have noticed that in those built before 1930 the quality of the original carpentry work is generally superior to that in hotels built afterwards. Therefore, carpenters working on hotels before 1930 must have worked with more skill, care, and effort than carpenters who have worked on hotels built subsequently.”

Which fact, if true, most weakens the conclusion?

Homework: 4

a. Carpentry in hotels is generally better than the quality of carpentry in houses.

- Compares hotels before 1930 & hotels after 1930. Houses are not relevant.

Homework: 4

b. Hotels built after 1930 have more rooms for guests than hotels built before 1930.

- Compares quality of carpentry. Number of rooms is not directly relevant.

Homework: 4

c. The materials used to build hotels before 1930 are not significantly different from the materials used after 1930.

- Compares workmanship, not materials.
- This might actually support the conclusion: if materials weren't better, maybe workers were?

Homework: 4

e. The average length of training for carpenters has declined significantly since 1930.

- No necessary connection between training time and workmanship.
- Again, might support the conclusion, not weaken it.

Homework: 4

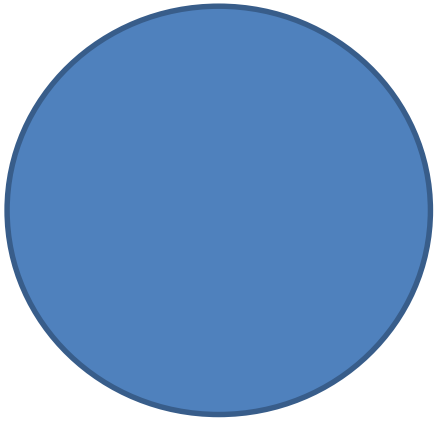
d. Buildings with better carpentry work are less likely to be torn down or remodeled later.

- Majority of pre-1930 buildings observed have good carpentry.
- It is likely that majority of all pre-1930 buildings have good carpentry. (Statistical generalization)
- BUT…

Homework: 4

d. Buildings with better carpentry work are less likely to be torn down or remodeled later.

- Buildings with poor carpentry are more likely to be torn down or remodeled.
- Therefore, observed pre-1930 buildings are not typical of all pre-1930 buildings.



Homework: 5

Advocate: If marijuana were legal, the government could charge taxes on the drug, increasing revenues. Criminal culture supporting the drug would vanish, saving money on fighting crime. Overall, there is a tremendous amount to gain by making the drug legal.

Prosecutor: Studies of legalizing drugs in other countries suggests that criminals will not give up their profits or play by the rules. Moreover, removing money from crime-fighting after such legalization gives those criminals more freedom.

What techniques does the prosecutor use?

Homework: 5

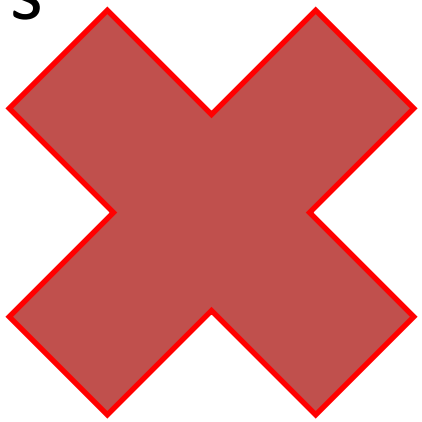
a. cites additional evidence which proves that the marijuana advocate's conclusion is false

- Doesn't "prove" anything categorically
- Compares to other places, which might have the same results, but might not

Homework: 5

b. advocate's argument is invalid, because the conclusion doesn't follow from the premises

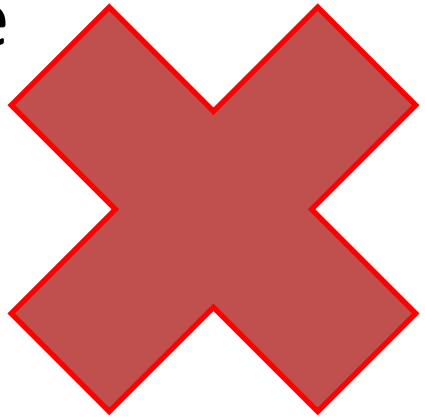
- Prosecutor introduces a different argument.
- He does not say that the advocate's argument is invalid.



Homework: 5

c. questions the relationship between cause and effect

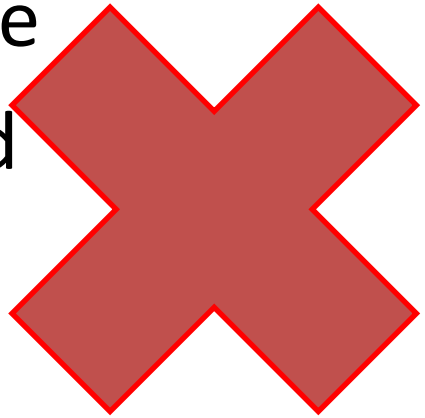
- Prosecutor introduces a different argument.
- He does not say that the advocate confuses cause and effect.



Homework: 5

d. argues that the same evidence could be used to support a different conclusion

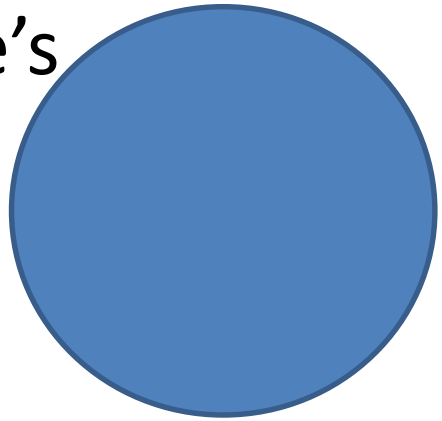
- Introduces a different argument
- Does not use the advocate's evidence
- Does not say that argument is invalid



Homework: 5

e. suggests, by analogy, potential drawbacks that might outweigh predicted advantages

- Analogy to other countries, where there are problems
- Does not deny validity of advocate's conclusion



Writing with logic

It is obvious to anyone thinking logically that minimum wage should be increased. The current minimum wage is an insult and is unfair to the people who receive it. The fact that the last proposed minimum wage increase was denied is proof that the government of this state is crooked and corrupt. The only way for them to prove otherwise is to raise minimum wage immediately. (Weber & Brizee 2012)

Writing with logic

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Nothing is 'proved'; it's only stated.

No evidence is offered.

If I don't already agree with you, you won't convince me.

Writing with logic

P1. Minimum wage should keep workers out of poverty.

P2. Current minimum wage does not do that.

C. Minimum wage should be increased.

Writing with logic

- Section 1: Evidence or appeal to make people agree with premise 1*

P1. Minimum wage should keep workers out of poverty.

*Note: Since this is not objectively true, a reader could disagree.

Writing with logic

- Section 2: Empirical evidence to show that premise 2 is true

P2. Current minimum wage does not keep workers out of poverty.

Writing with logic

- Section 3: Conclusion. Show how (normative) premise 1 and (true) premise 2 support the idea.

C. Minimum wage should be increased.

Writing with logic

The purpose of minimum wage is to ensure that workers can provide basic amenities to themselves and their families. When workers live below the poverty line, their families suffer and they do not contribute to society. Unfortunately, our minimum wage no longer reflects an increasing cost of living. At minimum wage, a full-time worker earns about ¥1,560,000 per year. The poverty rate is currently ¥2,160,000 per year. It is therefore possible to work full time and still live below the poverty line. In order to remedy this problem, minimum wage should be increased. (Adapted from Weber & Brizee 2012. Portions changed.)

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