

Introduction to the Course – Blue Notes

- An illustration (Dennis Adams)
 - <http://www.dennisadamsmasterhealer.com/default.htm>
- A hot debate
 - <http://freakonomics.com/podcast/bad-medicine-part-1-story-rebroadcast/>
- Four attitudes at the core of the scientific approach
 - Critical thinking, skepticism, Objectivity, and Curiosity
 - A cautionary story (on Candides, Skeptics, and skeptics)
- Some basic concepts
 - Assertions and Arguments
 - Deductive and Inductive arguments
 - Heuristic (adj. & noun)

- Is critical thinking important? Why, or why not?
 - YES!
 - It reduces the likelihood that conclusions will be based on unreliable personal beliefs, opinions, and emotions.
 - Some things will fit with your current beliefs, and some will challenge you to reconsider your assumptions.
 - Actively engaging in critical thinking is important in this class, and is becoming vital to navigating our current world.
 - “Critical thinking is easy when you don’t want to believe the claim, but it’s even more important when you want to believe it.” - *The Black Goat Podcast*
 - Critical thinking is more strongly associated (compared to IQ) with fewer negative life events (Butler et al., 2017)

Exhibit 1: Brigham & Bothwell (1983)

- Study 1:
 - Estimated % correct = 70.6%
 - Actual % correct = 12.5%
- Study 2:
 - Estimated % correct = 51.1%
 - Actual % correct = 32.3%
- Study 3:
 - Estimated % correct = 68.9%
 - Actual % correct = 31.3%

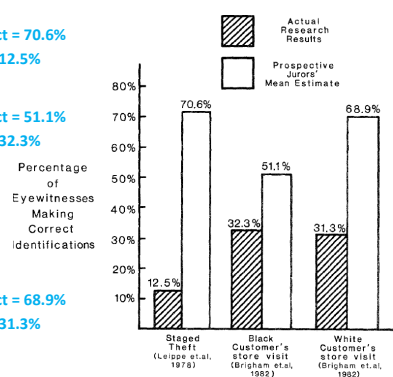


Fig. 1. Prospective jurors' accuracy in estimating research results.

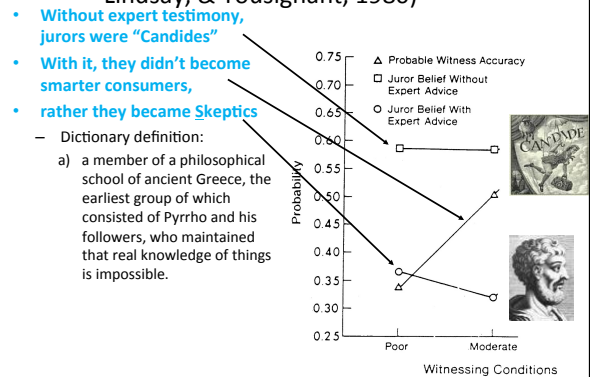
Wells et al. (1979): Results

- Accuracy of eyewitnesses fairly good
 - 58% correct,
 - 20% incorrect,
 - 21% made no identification
- When the witness was accurate, jurors tended to believe
 - 80% of the time. BUT
- When the witness was inaccurate...
 - jurors also tended to believe 79.5% of the time!

How might jurors' evaluation of eyewitness evidence be improved?

- Cannot
 - Eliminate eyewitness testimony
 - Eliminate juror observation of eyewitnesses
 - Not seat jurors who might be more accepting of such testimony (e.g., poorly educated jurors)
- Might
 - Improve procedures for getting eyewitness testimony (e.g., use less biased lineups)
 - Don't use weak eyewitnesses
 - Allow stronger cross-examination of eyewitnesses
 - Give jurors special education about the fallibility of eyewitness testimony
 - demonstrations
 - judicial instructions
 - expert testimony
 - Other?

Expert witnesses on eyewitnesses? (Wells, Lindsay, & Tausignant, 1980)



Developing skepticism

- One goal of this course is to nurture skepticism (for certain questions), NOT Skepticism
- But it's easier to create Skeptics than skeptics (or Candides)
- Suggestive evidence:
 - Negativity effects in human judgment
 - For example, suppose on an 11-point scale (-5=very bad; +5=very good)
 - "mean" = -4
 - "attractive" = +4
 - how would you rate someone who is "mean and attractive"?
 - "...bad information about another person appears to have a stronger effect on our impressions, evaluations, and reactions to that person than equivalently extreme good information (e.g., Baumeister et al., 2001; Skowrowski & Carlson, 1989)" (Kerr et al., 2007)
 - Likewise, a little bit of negative evidence can make us disbelieve easier than a little bit of positive evidence can make us believe
 - one lie from a friend can do more to destroy trust than several honest responses
- Hard core Skepticism can also be pervasive in its effects...

Some basic concepts: 1. Arguments (see Gray, Ch. 3)

- **Assertion**
 - "a linguistic attempt to state what is the case", i.e., a sentence that states something
 - for us (in ISS 305), assertion = statement = claim = conclusion
 - Examples?
- **Athletes are better students than others.**
- **You are sure to become a better research consumer after this class.**

Some basic concepts: 1. Arguments (see Gray, Ch. 3)

- Exercise stimulates the brain, releases endorphins, and heightens awareness; therefore, athletes are better students than others.
- Because this course teaches critical thinking skills and you will learn critical thinking skills, you are sure to become a better research consumer.

Illustration of an Argument

'U' can compete with Ivy League Schools

By Rebekah Amos (State News, January 18, 2000)

When it comes to financial success after college a \$120,000 Ivy League education doesn't necessarily offer more than less selective colleges do, a newly released study says.

According to "College and Beyond," a paper published by the National Bureau of Economic Research in Massachusetts, students' ambition, maturity and motivation have just as much or more to do with high earnings potential after graduation than where they attended college.

"What we found is that the studies conducted in the past didn't really focus on who the students were but more where they went to school," said Stacy Berg Dale, an author of the paper and researcher at the Andrew W. Mellon Foundation in New York City.

"The fact that they went to Harvard may not have as much to do with their success after college than the fact that they are gifted and are going to be successful no matter what," she said.

Better students tend to go to better schools, but gifted students will most likely do well whether or not they attend an Ivy League school, Dale said.

The study looked at the 1995 income of students who enrolled in a highly selective college in 1976.

The study found students who enrolled in colleges where the average age freshman SAT score was 1,200 earned about \$76,800. Students with similar test scores accepted by the highly selective colleges, but who enrolled in institutions where the average SAT was 1,000, earned \$77,700.

To some MSU students, the study's findings were something they already knew.

"Ivy Leaguers probably do get good jobs and make good money," said Dan Rohrhoft, an engineering no-preference freshman. "But not any more than someone with a Big Ten degree and some dedication."

Mechanical engineering freshman, Kevin Justusson, said "students' experience and hard work helps an individual succeed in the work force just as much or more than where people receive their diploma."

•What's the conclusion of this argument?

•What's the evidence?

•How good is the evidence?

– <https://www.usnews.com/education/blogs/the-college-solution/2011/03/01/the-ivy-league-earnings-myth>

– <https://www.wsj.com/articles/do-elite-colleges-lead-to-higher-salaries-only-for-some-professions-1454295674>

The Skill of Argument

- D. Kuhn (*The Skill of Argument*) suggests that
 - Most people (of all ages) do not engage in presenting conclusive evidence to defend their beliefs or claims;
 - they tend simply to provide supportive illustrations, e.g.,
 - Q: Does it increase starting salaries to go to a selective private college rather than to a public college?
 - Bob's A: "No, way. My friend Todd went to MSU and had a starting salary of \$150,000."
 - Fred's A: "Yes. The few people I know who recently graduated from Harvard are all rolling in money now."

Deductive Arguments

All toasters are items made of gold.

All items made of gold are time-travel devices.

Therefore, all toasters are time-travel devices.

VALID! – If the premises were true, their truth would guarantee the conclusion's truth.

All toasters (P) are items made of gold (Q).

All items made of gold (Q) are time-travel devices (R).

Therefore, all toasters (P) are time-travel devices (R).

This is technically a MULTIPLE Modus Ponens (or, multiple affirming the antecedent) because R is added.

You could think of it like $P = Q$;

$Q = R$;

$P = R$

Deductive Arguments

All tigers are mammals.
No mammals are creatures with scales.
Therefore, no tigers are creatures with scales.

VALID!

All tigers (P) are mammals (Q).
No mammals are creatures with scales (Not Q).
Therefore, no tigers are creatures with scales (Not P).

Deductive Arguments

- All basketballs are round.
The Earth is round.
Therefore, the Earth is a basketball.

- INVALID

- All basketballs (All P's) are round (Q).
The Earth (X) is round (Q).
Therefore, the Earth (X) is a basketball (P).
 - The 2nd premise tells us that the Earth (X) is round (Q), but it says nothing about basketballs (P), so the Earth (X) would be outside the Basketball set (P). However, the conclusion tells that the Earth (X) should be inside the basketball set (P). Therefore, this is invalid.

Deductive Arguments

- All popes reside at the Vatican.
John Paul II resides at the Vatican.
Therefore, John Paul II is a pope.

- INVALID

- You can apply the same form from before to the Pope example. Both the premises and conclusion are true, but the truth of the premises do not imply the truth of the conclusion. Substitute Random Joe in for John Paul II and it may make it easier to see. Also, there is a middle missing between P and X.

Valid deductive arguments

1. Affirming the antecedent (in Latin, *Modus Ponens*)

- Example:
If you smoke, then you'll eventually get lung cancer.

Jon smokes.

Therefore, Jon will eventually get lung cancer.

- Because the form here IS a valid/logical one, as long as the (general) premises are true, the (specific) conclusion MUST be true.

- However, one can get to a false conclusion using a valid argument IF the premises are false.

- What about here? Are the premises true?

- In this example, the first premise is false (some smokers never get cancer), so the conclusion doesn't have to be correct (Jon may be one of those smokers who never gets lung cancer).

- Hence, a valid/logical deductive argument doesn't guarantee a true conclusion.

- A quick easy way for me to remember the forms of valid and invalid deductive arguments is like this:
- Affirming the Antecedent (AA) = valid
- Denying the consequent (DC) = valid
- Affirming the Consequent (AC) = invalid
- Denying the Antecedent (DA) = invalid
- The further apart letters (AC and DA) are invalid, while the close together letters (AA and DC) are valid because they are close and validate each other. Just something I've used in past and decided to share.