

# Retrospective

- Formal view: validity and soundness; vagueness, ambiguity, equivocation, or other kinds of unclarity; false dilemma, straw man, appeal to force, etc.; analogy.
- Psychological view: the clustering illusion, the regression effect; confirmatory bias, hidden or absent data, or self-fulfilling prophecies; bias.

# Retrospective (cont.)

- Formal view: explanation; scope, content, unity, etc.; comparison class, dropout rate, averages, statistics, etc.; explanation evaluation
- Psychological view: difficulties we (as people) fall prey to when considering explanation (different criteria for explanations we do and don't like; practical failures of explanation in social cases; relying on second-hand information); considered some examples (alternative health, ESP, bad social strategies)



# Retrospective (cont.)

- Progressing and alternating:
  - *progressing* from theoretical/logical argumentation, to more practical empirical explanation
  - *alternating* between quantitative, precise, and objective characterizations and the relevant psychological, subjective constraints.

# Kinds of repair

- Eliminating the source of the problem



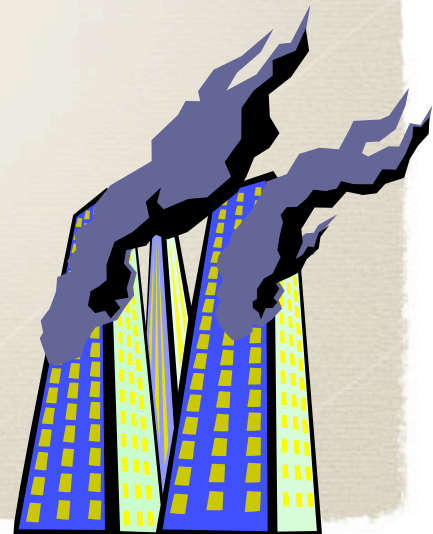
- Covering up the problem





# Kinds of repair (cont.)

- For thinking, the problem is one of generating and holding on to false or poorly justified beliefs.
- So, we have to resist our built-in tendencies to draw certain kinds of conclusions and see certain kinds of patterns when we know we may be misled (ignite the red light).



# Important pitfalls to avoid

1. Trying to draw conclusions from incomplete and unrepresentative evidence
2. Our amazing ability to explain a vast range of outcomes in terms of pre-existing theories and beliefs
  - a. "Suppose the exact opposite had occurred?"
  - b. "How would someone who does not believe the way I do explain this result?"
  - c. "What alternative theory could account for it?"



# Pitfalls to avoid (cont)

3. “Compartmentalized” reasoning (the methods are content free)
4. Uncertainties and distortions of second-hand information
5. Question whether our beliefs are as widely shared as they appear
6. Our tendency to find order in any complex set of data, and underestimating where and when regression/randomness (&!) happens

# An interesting result

- Many of the 'essential habits of mind' have come from the development of science.
- Science has as a central goal the generation of well-justified beliefs.
  - tests of these beliefs (theories) are codified and often carried out
  - elimination of bias in belief generation has become very important (biased beliefs won't survive good tests for long)



# An interesting result (cont.)

- Also, science is attempting to ‘expand’ our world-view
  - i.e. generate and test new beliefs
  - uncertainty and doubt are ever-present
- Typical of everyday decision making and belief formation as well
- The ability of most members of society to reason successfully in these (typical) circumstances seems to be quite limited

# An interesting result (cont.)

- This is a concern for a number of reasons:
  1. will a voting public be able to make informed decisions?
  2. does this mean that there is an inability to distinguish fantasy and reality?
  3. will our economy be able to continue to be strong if it is services-based?
  4. how will personal and public resources be allocated?
- All reasons that taking a course like this one is a really, really, good idea...



# An interesting result (cont.)

- A twist that Gilovich notes to these general observations is that a particular kind of science education seems to be more useful:
  - that provided by the 'messy' sciences like psychology and sociology.
  - Graduate students in chemistry and law do not improve in statistical reasoning between the time they start and two years later
  - Psychology students, in contrast, improve 75% and medical students improved 25%.

# An interesting result (cont.)

- Suggests that learning how to interpret statistical data in an academic setting can (actually!) be important for helping to make everyday decisions.
- Since everyday decisions are often statistical, and fraught with uncertainty.
- Knowing your own limits, and the best ways to counter them, seems to be an important part of being a justified (not true!) believer.



# Question

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