2.6: Selecting Among Alternatives

“The test of a first-rate intelligence is the ability to hold two opposing ideas in mind at the same time and still retain the ability to function.”  
- F. Scott Fitzgerald

Focus: Deciding optimally among several alternatives
   We are poor at considering abstract alternatives; tend to consider only one alternative.

Approach: Give all possibilities fair consideration — avoid confirmation bias
   - basically, try to detach yourself from any particular one
   - ideas tend to "stick". Instead of changing a cherished belief when new evidence appears, additional beliefs (auxiliary hypotheses) are added, to "protect" original beliefs.
   - main message: don’t cling—try to be as objective as possible. Methods like ACH can help
     o Flip side: Persevere if you’re convinced of your beliefs. But at least make sure that there are no facts directly against your hypothesis. (And keep in mind: Absence of evidence is not the same as evidence of absence.)

Main learning points:

Heuer: Analysis of Competing Hypotheses (ACH):

1. Generate as wide a range of hypotheses as possible
   o don’t need many, but should cover main set of possibilities
   o get feedback from others - brainstorm
   o defer judgement of hypotheses until this stage is complete
2. For each hypothesis, list evidence for and against
   o consistent or inconsistent with hypothesis
   o look for absence of evidence as well as presence
3. Determine the diagnosticity of each piece of evidence / relevant factor
   o identify evidence that is most helpful (critical data)
4. Refine set of hypotheses; Delete evidence that is not diagnostic
   o keep in background, just in case
   o possibly create more hypotheses, with more distinctions
5. Assess relative likelihoods of each hypothesis
   o maximum a posteriori testing (cf. Bayesian analysis)
   o include intuition – how “right” it feels
   o look for evidence that can disconfirm various possibilities
6. Sensitivity analysis (cf Heuer, ch. 6)
   o Cf perception – generic viewing conditions
7. Pick max likelihood
   o keep others around, for absolute comparison, and possible new routes
8. Prepare for new evidence when it arrives / look for new evidence
   o keep evolving
Real-World Segment: Kinds of careers in research

Key elements in choosing a career:
1. you like it
2. you’re good at it
3. there’s a need for it

Types of career
- **academic**
  1. lots of freedom
  2. work with interesting people
  3. very secure position
  4. salary: medium
  5. opportunities for ego (fame)
  6. relatively little time for research
  7. need to work to get (major) funding
  8. geographical restrictions

- **government**
  1. lots of freedom (at least, in particular domain)
  2. work with interesting people
  3. very secure position
  4. salary: medium
  5. not much opportunity for ego (but can often publish)
  6. more time for research
  7. (major) funding usually available
  8. geographical restrictions

- **industry**
  1. limited freedom (and may have to be applied)
  2. work with interesting people
  3. fairly secure position
  4. salary: medium-high
  5. not much opportunity for ego
  6. more time for research
  7. (major) funding usually available
  8. fewer geographical restrictions

- **consultant**
  1. lots of freedom (at least in theory; in practice may differ) - lots of variety
  2. work with interesting people
  3. insecure position
  4. salary: medium-very high
  5. not much opportunity for ego
  6. some time for research, but often limited
  7. need to work to get funding (and get paid)
  8. relatively few geographical restrictions